From: Brandt.Kit@epamail.epa.gov
To: Jen.Mark@epamail.epa.gov
Date: 12/19/2012 11:09:31 AM
Subject: Re: Fw: Scoping Comments for Mining Projects
Attachments: 01-012-AFS DEIS Greens Creek Tailings Disposal.docx
01-012-AFS NOI Greens Creek Mine Expansion.doc
01-012-AFS EPA Detailed Comments PDEIS.docx
01-012-AFS PDEIS Greens Creek Tailings Expansion suggested format.doc
01-012-AFS DEIS Greens Creek Expansion Signature.docx
10-030-BLM Scoping Dairy Syncline Phosphate Mine .doc
01-012-AFS DEIS Greens Creek Tailings Disposal.wpd
01-012-AFS NOI Greens Crek Mine Expansion.doc

(See attached file: 01-012-AFS DEIS Greens Creek Tailings Disposal.docx)(See attached file: 01-012-AFS DEIS Greens Creek Tailings Disposal.wpd)(See attached file: 01-012-AFS EPA Detailed Comments PDEIS.docx)(See attached file: 01-012-AFS NOI Greens Creek Mine Expansion.doc)(See attached file: 01-012-AFS NOI Greens Crek Mine Expansion.doc)(See attached file: 01-012-AFS PDEIS Greens Creek Tailings Expansion suggested format.doc)(See attached file: 01-012-AFS DEIS Greens Creek Expansion Signature.docx)
(See attached file: 10-030-BLM Scoping Dairy Syncline Phosphate Mine .doc)

Mark Jen---12/18/2012 02:30:27 PM---Hi Kit, I do not have access to the Regional NEPA database and Lynne recommended that I look at 2 sc

From: Mark Jen/R10/USEPA/US
To: Kit Brandt/R10/USEPA/US@EPA
Date: 12/18/2012 02:30 PM
Subject: Fw: Scoping Comments for Mining Projects

Hi Kit,

I do not have access to the Regional NEPA database and Lynne recommended that I look at 2 scoping comments from the Greens Creek and Dairy Syncline mines. Can you find these scoping comments and forward them to me?

Thank you! Happy Holidays!

Mark S. Jen | Environmental Scientist
| U.S. Environmental Protection Agency | Region 10 |
| Alaska Operations Office | 222 W Seventh Avenue #19 | Room 537 |
| Anchorage, Alaska 99513-7588 |
| Office: 907-271-3411 | Cell: 907-602-8495 | Fax: 907-271-3424 |
| E-mail: jen.mark@epa.gov |

----- Forwarded by Mark Jen/R10/USEPA/US on 12/18/2012 01:28 PM -----

From: Lynne McWhorter/R10/USEPA/US
To: Mark Jen/R10/USEPA/US@EPA
Date: 12/18/2012 12:48 PM
Subject: Re: Scoping Comments for Mining Projects

Hi Mark! unfortunately I gotta run now, but off the top of my head check out Greens Creek, Dairy Syncline are two of the latest. I'll be back in the office on Dec 31st and would love to catch up and chat about any questions you have so feel free to give me a call or

shoot me an email.

Hope you're doing well!

Happy Holidays from Ida ho ho ho
Lynne

*~^~^~^~^~^~^~^~^~^~^*
Lynne Ann McWhorter
NEPA Review
US EPA Region 10
Idaho Operations Office
950 W Bannock
Suite 900
Boise, Idaho 83702
Phone- (208) 378-5757

NEPA Website:
http://yosemite.epa.gov/R10/ECOCOMM.NSF/webpage/national+environmental+policy+act

Mark Jen---12/18/2012 02:42:50 PM---Hi Lynne, How are you? Are you enjoying life in Boise, Idaho? Hope you are getting settled into th

From: Mark Jen/R10/USEPA/US
To: Lynne McWhorter/R10/USEPA/US@EPA
Date: 12/18/2012 02:42 PM
Subject: Scoping Comments for Mining Projects

Hi Lynne,

How are you? Are you enjoying life in Boise, Idaho? Hope you are getting settled into the scene there.

When you have a moment, would you be able to share any previous scoping comments regarding mining projects. I am working on the Donlin Gold Project and we are in the scoping process now. I am interested in seeing language regarding Financial Assurance. I want to make certain we are consistent for all mining projects in the Region.

I looked through the share drive and did not see any scoping comments related to mines.

Thanks!

Happy Holidays to you and yours!

Mark S. Jen | Environmental Scientist
| U.S. Environmental Protection Agency | Region 10 |
| Alaska Operations Office | 222 W Seventh Avenue #19 | Room 537 |
| Anchorage, Alaska 99513-7588 |
| Office: 907-271-3411 | Cell: 907-602-8495 | Fax: 907-271-3424 |
| E-mail: jen.mark@epa.gov |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: ECO-088

01-012-AFS

Thomas Puchlerz, Forest Supervisor
Tongass National Forest, Supervisor's Office
648 Mission Street
Ketchikan, Alaska 99901-6591

Dear Mr Puchlerz:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (EIS) for the *Greens Creek Tailings Disposal* (CEQ #030181) in accordance with our responsibilities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. The draft EIS examines changing the existing Greens Creek Mining Company Plan of Operation to create additional space for tailings disposal, thus facilitating the continued operation of the Mine. The draft EIS identifies Alternative C, the alternative that proposes adding carbon to enhance immobilization of dissolved metals, as the preferred alternative.

We have helped your Agency develop parts of the EIS that deal with water quality as a cooperating agency due to our knowledge and authorities concerning water quality and the Clean Water Act. We submitted several sets of comments on preliminary versions of the draft EIS. These comments focused on ensuring a balanced presentation of some key but very complex technical issues, including the degree of uncertainty associated with some of the draft EIS findings.

We have rated the draft EIS, EC-2 (Environmental Concerns-Insufficient Information). We base our environmental concerns on:

- Uncertainty about whether water would meet AWQC (Alaska Water Quality Criteria) for sulfate and selenium
- Missing information associated with the preferred alternative on water quality impacts for eight key parameters;
- Inconsistent use of AWQC and NPDES effluent limits;
- Uncertainties about the source, type, amount, and placement of carbon (associated with the preferred alternative) to effectively immobilize dissolved metals, and
- A confusing and overly technical discussion of pyrite circuits which effectively prevents comprehension and consideration by lay readers.

It is our understanding from participating as a cooperating agency, from

statements on pages 2-11 and 4-14, and from discussions with Bill Oelklaus, Environmental Manager for Kennecott Greens Creek Mining Company (KGCMC), that the existing treatment system would be used in conjunction with Alternative C if necessary to ensure attainment of AWQC until such time as project post-closure monitoring indicates such treatment is no longer necessary. This critical mitigation measure must be spelled out clearly in the preferred alternative. Furthermore, bonding for potential long-term waste water treatment should be part of any Forest Service and/or State permit for the project. Please clarify these points in the final EIS. EPA would have environmental objections to Alternative C without the use of the existing treatment system because the draft EIS predicts it would result in exceedances of AWQC at the point of compliance.

We appreciate the opportunity to review this draft EIS and participate in the development of this EIS as a cooperating agency. We are interested in continuing to work with the Forest Service to resolve these issues. Please feel free to call Bill Riley, Regional Mining Coordinator, at (206) 553-1412, or Chris Gebhardt, lead NEPA reviewer, at (206) 553-0253, to discuss our comments and how they might best be addressed.

Sincerely,

Judith Leckrone Lee, Manager
Geographic Implementation Unit

cc: Stan Foo, DNR
Pete McGee, ADEC
McKie Campbell
Bill Oelklaus, KGCMC
John Leeds, ACOE

EPA Detailed Comments on the Draft Environmental Impact Statement for the Greens Creek Tailings Disposal

General Comments

Predictions that the Preferred Alternative Would Exceed the Sulfate Standard

The draft EIS predicts that the preferred alternative would result in water quality that exceeds the Alaska Water Quality Criteria (AWQC) for sulfate at the point of compliance (i.e., the lease boundary). The final EIS should include design elements, including mitigation measures, that ensure that the preferred alternative would meet applicable AWQC both during operations and after closure. As stated in the cover letter, it is our understanding that Kennecott Greens Creek Mining Company (KGCMC) intends to rely on the existing waste water treatment plant to assure compliance with AWQC and also intends to examine the use of passive wetland treatment systems as a potential means of effectively treating runoff and leachate from the tailings pile. These measures need to be described and incorporated into the action alternatives along with data that demonstrates that AWQC will be met for sulfate after treatment. This is discussed in more detail below.

Critical Water Quality Information Missing for the Preferred Alternative

The draft EIS lacks predictions of water quality impacts associated with the preferred alternative for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver (see p. 4-27). The preliminary draft EIS contained this information so it is apparently an oversight. The final EIS must include water quality predictions for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver for Alternative C, the preferred alternative, and demonstrate attainment of AWQC for all parameters.

Inconsistent and Confusing Use of AWQSs and NPDES Effluent Limits

The draft EIS compares the water discharged from the tailings pile to freshwater AWQC for each alternative to determine exceedences but then compares the loading to the current permit which uses marine AWQC as its basis for calculations. Either the discharges from the pile are going to the freshwater environment surrounding the pile (making the comparison to marine water irrelevant) or they are going to the marine environment (making the freshwater standards irrelevant). It is very confusing to read that the discharge won't meet AWQC but when compared with the "allowable" loads, they were less than "some small" percent of those prescribed in the current permit. The final EIS should explain what set of criteria - marine or freshwater - is relevant to protect

beneficial uses and then consistently use those standards for comparison purposes.

Use of Existing Water Quality Treatment to Ensure AWQCs Are Met

The draft EIS rarely discusses using the existing water treatment plant, if needed, to ensure attainment of AWQC. Readers could question whether continued use of water treatment is actually proposed. Descriptions of the tailings pile in the alternatives chapter (Figure 2-5) indicate that the tailings pile would cover the location of the existing water treatment plant. Only Alternative B addresses this problem by relocating the treatment plant. This oversight could also raise questions in the readers' mind about whether the preferred alternative would include using water treatment if needed. The final EIS must explicitly and clearly describe water treatment for all alternatives in chapter two, identify the new location of the water treatment plant, describe the overall effect on water quality from proposed actions and mitigation measures (including water treatment), and demonstrate that the mine is sufficiently bonded to operate the water treatment plant for as long as necessary.

Uncertainty about the Method and Effectiveness of Carbon Addition

The EIS indicates that the preferred alternative would employ an adaptive management approach for adding carbon to enhance immobilization of dissolved metals. This strongly contrasts with the specific direction in Alternative D for carbonate addition where the final EIS specifies the amount of carbonate needed to fully neutralize the tailings and prevent the onset of acid rock drainage (ARD). To ensure that the preferred alternative would successfully deal with the potential for ARD and metals mobilization, the final EIS should answer as many questions as possible related to the feasibility and effectiveness of carbon addition. For example, the final EIS should describe more specifically how amending the tailings with carbon leads to sulfate reduction, where such an approach has been used and with what success, describe potential sources of carbon, their respective methods of application, and provide a rough estimate of the amount of carbon that might be needed. This section should describe the types of sulfide reducing bacteria that occur in the pile and the potential for the proliferation of other bacteria that could deter or perhaps reverse the sulfate reduction process (e.g., Thiobacillus ferrooxidans).

Confusing and Overly Technical Discussion of Pyrite Circuits

The discussion about pyrite circuits is overly complex. The EIS should summarize and simplify the discussion with flowcharts and diagrams that explain the basic physical and chemical processes in a pyrite circuit, a chart summarizing the differences between the pyrite circuit alternatives, and a simple explanation of why the pyrite circuit alternative was not considered in detail.

Monitoring

The draft EIS states (Page 2-35, Section 2.3, Monitoring) that no new monitoring plan has been developed because the existing plan is functioning appropriately. The final EIS should strive to incorporate up-to-date monitoring data that correctly depict the impacts of the current facility. Freshwater Monitoring Plan monitoring data for 2001 were only recently released in a 2001 annual report and this release followed preparation of the draft EIS. The final FEIS would benefit from inclusion of an evaluation of those results and other monitoring data at least through 2002 or even early 2003. Including up-to-date data would better disclose current conditions, anticipate impacts related to expansion alternatives, and indicate any need for increased monitoring. With this comment in mind, it is noted that Section 3.8 on ground water quality summarizes information on the occurrence and interpretation of elevated sulfate conditions in what would appear to be virtually all downgradient ground-water directions from the tailings pile, including north, south, and west. Though the interpretations presented in the draft EIS (page 3-42) suggest only contaminant sources other than leakage from the tailings pile, up-to-date monitoring information could help eliminate alternative explanations and could indicate that areas should receive improved monitoring coverage to amply measure the water conditions or to answer still unanswered questions. The same need to have up-to-date monitoring information applies to surface water, particularly the Hawk Inlet Catchment as described on page 3-46 and 3-47 of the draft EIS.

Interim Closure Measures in the Event of a Temporary Shut Down

The Greens Creek Mine is an underground zinc/silver mine. The EIS should describe the potential impact of current historically low zinc prices on the continued operation and reclamation of the Mine. The EIS should also describe specific measures that would be taken in the event of a temporary suspension of operations to prevent oxidation of tailings, as is required by the ADEC solid waste permit. This is critical since the continual addition of fine-grained tailings to the pile helps to impede oxidation.

Specific Comments

The draft EIS does not contain a summary as required by 40 CFR 1502.12. The final EIS should include a summary.

Page 1-1 explains the mining process - ore concentrate would be trucked approximately nine miles to the Hawk Inlet port at the Cannery, etc. The EIS should describe these connected actions and the additional impacts from continuing to mine ore reserves beyond those described in earlier NEPA documents.

Page 1-2 states that the remaining storage is estimated to last roughly 2 years versus 4 years on page 3-4 of the PDEIS. Please explain why.

Page 1-5 states the purpose and need statement. The proposed action entails changing the plan of operation, not merely considering changing the plan of operation. The purpose and need statement should be written in a more active way.

Page 1-5 states that permitting this expansion would require modifying the existing lease. Is this a decision to be made based on information in this EIS?. We recommend that the EIS succinctly identify all the decisions to be made using a bulleted format.

Page 1-6 states that before the proposed expansion could begin, the existing reclamation plan would need to be updated to set performance criteria for achieving AWQC. The EIS should explain when and how performance criteria would be set.

Page 1-8 describes the engineered cover or cap. This section should quantify the amount of water running off the cap and describe the extent that evapotranspiration and cap design are reducing the water flowing off the cap.

Page 1-14 could also describe EPA's Section 309 and NEPA review responsibilities.

Page 1-15 states that discharges must meet all effluent limitations including technology standards for water quality. Technology-based effluent limitations and water quality-based effluent limitations are different and both must be met to satisfy the CWA.

Page 1-16. Section 1.6.2 should be revised to reflect the current State structure.

Page 2-1, Section 2.1, Issues and Alternatives Development. Under Water Quality, The draft EIS notes that the process of greatest concern is sulfide oxidation which can lead to the release of sulfate and heavy metals into water. The release of acidity should also be added to the list.

Page 2-2 states that sulfate reduction helps to reduce the concentrations of critical metals, especially zinc. This sentence should explain how sulfate reduction helps to reduce the concentrations of critical metals.

Page 2-2 describes the no action alternative. The EIS should state how long the mine could operate until limits to the size of the tailings pile would force operations to cease.

Page 2-5 states that 29 acres of the permitted 56 acres would be used for the tailings pile. This section should briefly state how the other 27 acres would be used.

Page 2-11 states that Alternative B would entail continued treatment of tailings contact water during operation but does not describe or summarize the existing treatment system. The EIS should do this.

Page 2-11 should define what is meant by phreatic levels.

Page 2-12 states that Alternative C would utilize the post-closure construction of an engineered soil cover on the pile to minimize infiltration of oxygen and water into the pile. The EIS should describe the type of soil proposed to be used, the effectiveness of the soil in minimizing oxygen and water, the availability of this soil, and the cost of the cap (to address economic feasibility and reclamation concerns).

Page 2-12 states that this alternative aims for long-term chemical stability of the tailings through a continuous addition of carbon. Ideally, the EIS should describe how carbon would be transported from the Cannery, the extent of the carbon supply, the amount added, and the longevity of the carbon in the pile. However, the EIS states that results from a sulfate reduction monitoring plan (SRMP) would determine the amount of carbon used. The EIS should state at least conceptually how carbon could be injected into the pile.

Page 2-13 states that when compared to the proposed action, this alternative would reduce both the lease area and the disturbed area within the Monument by approximately 22 acres, and increase the lease area and disturbed area outside the Monument by 4.8 acres. It appears that changing the location of the footprint could minimize the extent of impacts within the Monument for the other alternatives. The final EIS should state if redesign could minimize impacts to the Monument.

Page 2-15. Figure 2-4 shows that the tailings footprint covers the existing water treatment plant but the list on this page does not indicate that relocating this plant is part of the plan. What happens to it?

Page 2-19 identifies one element of Alternative C as the construction of a new water management pond system. The EIS should describe the system to a greater extent including if ponds are lined or unlined.

Page 2-19 states that it is anticipated that additional carbon from an external source will be required to assure long-term sulfate reduction and chemical stability of the tailings disposal facility. The EIS should identify the potential types and location(s) of the external source of carbon, identify how much could potentially be needed, and the possible range of associated costs.

Page 2-19 states that the SRMP would determine the best form of supplemental carbon addition, the required amount, and the best method of application. To the extent possible, this information should be in the EIS. For example, the EIS should identify the best supplemental carbon addition and its application based on sample testing and available carbon sources and predict a range of possible quantities based on chemical analysis.

Page 2-19 states that post-closure water quality meets applicable effluent limits in the Kennecott NPDES permit. The current permit, however, contains effluent limitations applicable to a discharge to marine waters, not fresh waters. This is a source of confusion.

Page 2-20 states that about 2 million tons or 1 1/2 million cubic yards of limestone would be needed to sufficiently neutralize the tailings. The EIS should explain why it can specify quantities for limestone addition but not for carbon addition - the preferred approach for avoiding metals mobilization.

Page 2-20 states that tailings placement and pile height would be the same as Alternatives B and C. The first paragraph of this section, Figure 2-6 and Table 2-1, all say that the tailings placement area increases. Please reconcile these different

statements.

Page 2-25. Section 2.2.1, Figure 2-7 shows the relocated treatment plant for Alternative B but relocation of this plant is not shown on any of the other figures for other alternatives even though the area where it is now located is proposed to be covered with tailings.

Page 2-27 discusses cap design as a method to protect surface water. The final EIS should predict precipitation uptake through evapotranspiration. It should also predict how much precipitation would infiltrate through the cap following vegetation.

Page 2-27 states that drainage water will continue to be captured through the drain system, flow into the wet-wells, and subsequently be transferred to the water treatment plant. The EIS should state if drainage systems would be maintained after mine closure and if money is set aside to ensure that such maintenance occurs.

Page 2-28 describes the cap layers. The EIS should state if material is readily available to construct each layer of the cap.

Page 2-31. Define what are “-3" and “-2" materials.

Page 2-32 states that the company will identify sites that exhibit an existing ability to maintain enough water year-round for effective reestablishment of a wetlands environment. The EIS should contain this information.

2-33. Section 2.3 states that the company continually analyzes water quality. Is monitoring happening continually (i.e., indefinitely in time without interruption) or frequently? The EIS should explicitly state how often monitoring occurs happens (e.g., the company analyzes water quality weekly, monthly, etc.).

2-33. Section 2.4.1 See comments about AWQC in general comments. Moreover, it is very confusing to read that the discharge would not meet AWQC but when compared with the “allowable” loads, they were less than (some small percent) those prescribed in the current permit. The final EIS should explain what set of standards is relevant to protect beneficial uses and then consistently use those standards for comparison purposes.

Pages 2-33 - 2-35 discuss water quality. It is difficult to understand the effects of different alternatives on water quality, especially compliance with AWQC, due to ambiguities about whether or when treatment occurs, marine discharge versus freshwater discharge, and the location of the point of compliance.

Pages 2-38 - 2-50 discusses pyrite circuit scenarios. This section is overly complicated to the extent that it precludes understanding by non-technical readers. The EIS should include flowcharts and diagrams that explain the basic processes of a pyrite circuit and

what happens chemically and a chart summarizing the differences between the pyrite circuit alternatives.

Page 3-1 states that the Greens Creek Mine is an underground zinc/silver mine. The EIS should describe the potential impact of current historically low zinc prices on the continued operation and reclamation of the Mine. The EIS should also describe specific measures that would be taken in the event of a temporary shutdown to prevent oxidation of tailings, as is required by the ADEC solid waste permit.

Pages 3-1 and 3-2 list issues. We recommend that the EIS list issues in order of importance, from most important to least important.

Page 3-4. Recommend that Table 3-1 also include annual precipitation.

Page 3-4. The title of Table 3-1 states that it contains the data from 1994 - 2000 yet the table only shows 1997 - 2000 data. The final EIS should include data from 1994-1997 or change the title, and, if possible, include more recent data.

Page 3-7 states that the project site area has been designated as having attained air quality standards, or as being unclassifiable for all criteria pollutants. The final EIS should define “unclassifiable” for those readers unfamiliar with the Clean Air Act.

Page 3-15 should read, “Turbidity averaged 0.556 Nephelometric Turbidity Units.”

Page 3-15 should explain why lead concentrations in Hawk Inlet and outside the sill vary, with location, from below detection limits to near acute levels.

Page 3-7 should state if the tripling of lead in polychaete worm tissue is attributable to mine activities.

Page 3-17 should estimate the percentage of argillites and phyllites in the ore rock and the overall buffering capacity these geologic layers would provide.

Page 3-18 discusses treated water discharging into Hawk Inlet. The EIS should explain how water is currently treated.

Page 3-23 should explain or define “quiet water marine”.

Page 3-31. The EIS should explain why a map of Alternative B is in the affected environment chapter.

General. Including the applicable water quality standard on charts discussing water quality would be extremely useful to reviewers to understand unacceptable pollution levels.
Page 3-42 should state when the source of the sulfate in the Pit 5 area will be confirmed by excavating test pits and conducting additional geochemical and water quality analyses.

Page 3-47 should explain why the lower pH caused by the old access road constructed of rock containing pyrite is not indicative of the reaction that may be occurring in the tailings.

Page 3-49 states that Vos estimated that acidification would not occur for more than 10.9 years, which would provide ample time for application of site closure technologies (e.g., the cover) to mitigate the ARD risk. The EIS should clarify how there would be “ample time” if mining is to occur for an additional 22 years before placing the cover on the tailings pile.

Page 3-50, Section 3.8, Water Quality. The DEIS uses paste pH measurements of tailings (shown in Figure 3-14) to support the concept that the tailings will neither acidify during operations nor for an indefinite period after closure. The same data are used in Appendix B (Michael Baker, Inc, 2003, pages 25-26) to conclude that the tailings have maintained an alkaline pH throughout the operation of the facility. However, these data may be somewhat misleading in that a check on the source of the most recent paste pH values shown in Figure 3-14, those from 1999, are listed in the Shepherd Miller, Inc (2000) reference as rinse pH rather than paste pH values. The paste pH values for the 1999 tailings samples, as listed in the Shepherd Miller reference, are all lower in pH than the rinse pH values, and none are alkaline. Interpretive statements based on an assumption of alkaline paste pH for tailings should be corrected in the EIS. The EIS should verify data and interpretive statements that have been carried over from previous reports.

Figure 3-13 on page 3-51 should explain why more recent data points are indicating more acid generation potential.

Page 3-58 should explain why zinc is not liberated in the milling process if argillite contains abundant amounts of it.

Page 3-63 references Appendix D, the Jurisdictional Wetlands Survey. Appendix D is the Sensitive Plant Species Survey, Appendix A is the Jurisdictional Wetlands Survey.

Page 3-64 and 3-67 describes wetland and general plant associations, respectively. The EIS should contain maps identifying these plant complexes.

Page 3-67 references Appendix D, Wetlands. Wetlands is in Appendix A, not Appendix D.

Page 3-74 should describe the general population trend of Sitka black-tailed deer and waterfowl and shorebirds. The EIS should also state if the increase in deer accidents in the Year 2000 was attributable to an increase in the deer population.

Page 3-76 should spell out the Red-br. Sapsucker.

Pages 3-78 and 3-80 both contain section on Marine Mammals and describe species listed under the Endangered Species Act. The EIS should consolidate its Marine Mammal section and identify species protected under the Marine Mammal Protection Act.

Pages 3-80 and 3-81 state that staff have observed few Steller sea lions transiting near the mouth and within Hawk Inlet every year but paragraph 4 on page 3-85 states that when the salmon are running, sea lions are abundant inside the Inlet. The EIS should reconcile these statements.

Page 3-83 should define seafloor features.

Page 3-89 references Section 3.1 (Oceanography). Section 3.6.7 is Oceanography not Section 3.1 (Location). The final EIS should correct this.

Page 3-94 should explain why Table 3-14 contains only pre-mining data when data is collected annually.

Page 3-95, Section 3.13.6 is entitled “Summary of Freshwater Environment” but does not discuss Essential Fish Habitat, the subject of Section 3.13. Subsection 3.13.6 should summarize Essential Fish Habitat (EFH) in both marine and freshwater environments.

Page 4-1 should state what the life of the mine would be if Alternative A is adopted.

Page 4-3, Section 4.1.1 - The discussion of effects in ➢3 is also included in ➢1. The final EIS should consolidate these discussions.

Page 4-5 discusses connected actions (past, present, and reasonably foreseeable future). The EIS should discuss the possibility of a shutdown caused by historically low zinc prices.

Page 4-8 should discuss who would view the altered landscape and the impact of altered views on the viewers. For example, the EIS should state if the view would affect the attractiveness of the area to cruise liner passengers and people on guided tours.

Page 4-10 identifies the need for a monitoring program to measure metals uptake by wetland communities and stream sediments, and bioaccumulation. The EIS should also identify follow-up actions for contingencies that occur and are detected by the monitoring plan.

Page 4-11 should explain why the model developed by Environmental Design Engineering did not consider carbon addition.

Page 4-11 should contain a flow chart identifying what models are used for different points in the hydrologic cycle (e.g., precipitation, infiltration, etc.).

Page 4-12 discusses a time frame of 50 to 500 years. The EIS should state if changes already occurring due to global climate change have been factored into the models.

Page 4-13. See comments above from Chapter 3 on comparing the freshwater AWQS and technology-based loading limitations.

Page 4-14 states that Kennecott Mining will continue an appropriate method of water treatment until the tailings effluent can be discharged without treatment so that applicable AWQC are met. The draft EIS never fully identifies applicable AWQC, instead making comparisons to both freshwater AWQC and the loading limits of the current permit for discharges to marine waters (not the marine water AWQC).

Page 4-14 should state how surface water runoff from the pile would be treated.

Page 4-16. Table 4-2 and other water quality tables should highlight the text differentiating the tables (e.g., underdrain flow and downgradient groundwater).

Page 4-18 should explain Table 4-2.

General. The EIS shows that the level of some pollutants for all alternatives would exceed water quality standards. EPA will object to degraded water quality. The EIS must show how the preferred alternative would meet water quality standards.

Page 4-21 references Appendixes B for the ADEC permit. Appendix F contains the ADEC permit - not Appendix B. The final EIS should correct this.

Pages 4-26 and 4-27 contain the same table. The EIS lacks a table showing the effect of Alternative C on water quality for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver. This water quality information for the preferred alternative is critical.

Page 4-33 should indicate whether proposed activities are covered under an existing nationwide permit. In addition, the EIS states that these wetlands received a “low” value rating in the functions and values analysis partly because of their proximity to existing disturbance. The EIS should discuss the total impairment to wetlands in the cumulative effects section.

Page 4-34 states that activity associated with the proposed stormwater pond system would fill approximately 300 linear feet of high value riparian wetland. The EIS should describe this high value wetland in the text description for other alternatives and show it on maps.

Page 4-43, Section 4.10 states that any discharge will be required to meet the AWQC for the protection of the marine uses (listed in 18 AAC 70.020). This document, however, never uses these standards for comparison purposes. The tables in Chapter 4 use the freshwater criteria and the loading limits of the current permit. The loading limits of the current permit use an authorized mixing zone making the technology-based limits, which are not subject to mixing zones, more stringent than the water quality-based limits for many parameters.

Page 4-45 contains a section on the socio-economic impact. The EIS should state the

effect on recreational opportunities, if any exist, from expanding the mine and the tailings pile.

Page 4-48 and 4-49 spends one page of text defining cumulative effects in the context of the project rather than describing them. The information here is insufficient. Recommend that this section be significantly altered to describe the effect on resources of concern over time and space. Focus on how water quality, monument values, and wetlands have been impacted over time due to various activities.

Page 4-50 should also include the Marine Mammal Protection Act as part of Section 4.16.3.

Page 4-51 section 4.16.4 describes future actions not future cumulative impacts. The little effects' analysis focuses on socioeconomic effects. This and other cumulative effects pieces should be developed around resources rather than activities and focus on the environmental aspects.

Editorial Comments (No response to comments necessary.)

Page 2-6. Change "however the height would increased by 80 feet above original ground surface to about 160 feet"to "however the height would be increased from 80 feet above the original ground surface to about 160."

Page 2-11. Correct the format of bulleted text.

Page 2-13. Change sentence to read, "(approximately 12 years at present rate of production for known reserves and 10 years for potentially developing undiscovered reserves)."

Page 2-19, ◆3. Correct "system.Installation".

Page 2-23. Correct "a low permeability liner would required".

Page 2-28, Footnote 1. Correct "spruce trees are typically very shallow Greens Creek has informally".

Page 2-31. Change the different font inside the parentheses at the top of the page so it is consistent with the rest of the text.

Page 3-63. Correct misspelled "Habitats of the Unites States".

Page 3-79. Change the font of "Polystichum aleuticum" so that it is the same size as the other text.

Page 3-88. Place a space between "Road Mile" and "7.2".

Page 3-93. Replace the ":" with a "." for the text "flows at about 1:0 cfs".

Page 3-100. Replace the "0" in "0ver 95 percent" with an "O".

Page 3-100. Remove the "," after "commercial fishing vessels, (George, 1982)".

Page 3-101. Remove the "e" and replace "predominate" with predominant" in "residents are e predominate users".

Page 3-102 and other locations. Consistently use ADF&G or ADFG.

Page 4-6. Add a "." in "Admiralty Island National As shown".

Page 4-15. Remove the "and" from "Alternative A are shown in Table 4-2 and ."

Page 4-15. Remove the second "discharge" from "marine discharge discharge permit".

Page 4-42. Change the word "form" to "from" in "pressure form harvesting".

Page 4-47. Remove the word "the" in "more than the under the no action".

Page 4-50. Correct the phrase "that govern general land used in (http: . . .)."

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

November 19, 2010

Sarah Samuelson
Interedisciplinary Team Lead
Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

Re: Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for the Greens Creek Mine Tailings and Waste Disposal Expansion.
EPA Project Number 01-012-AFS

Dear Ms Samuelson:

The U.S. Environmental Protection Agency (EPA) has reviewed the NOI for the expansion of Greens Creek Mine located on Admiralty Island within the Tongass National Forest. Our review was conducted in accordance with EPA responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA).

Greens Creek mine is an underground mine that has been operating since 1987, there have been several NEPA iterations throughout this time. The most recent EIS analyzed a proposed expansion to extend the mine life 10 years and a Record of Decision (ROD) was signed in 2003. The current proposal would double the current facility and allow for approximately 15 to 20 million tons of tailings and waste rock. The analysis evaluates activities over the next 30 to 50 years and will tier to the 2003 EIS. EPA is a cooperating agency for the development of the current EIS due to our expertise in water resources and Clean Water Act (CWA) regulations. We appreciate the time that you and Forest Service staff have spent engaging EPA in the pre-scoping meetings and site visit. These ongoing meetings and the additional information that we have been provided (e.g., the 2009 Environmental Audit) have helped us understand the context of the expansion, current conditions at the site, and issues that will be analyzed in the EIS. We again stress that we believe this EIS should be a stand alone document due to the need to update information from results of subsequent studies at the site since the 2003 EIS and the need for a thorough analysis of reclamation and potential post closure, long term water treatment.

Water quality is one of EPA's principal concerns at this facility. EPA's concerns with water quality from mine facilities are based on the existence of acid generating waste rock, impacts to waters of the U.S. from expanded facilities, waste rock disposal site stability, and the potential need for long-term water treatment. In addition to meeting statutory requirements under the CWA, we believe that adequate mitigation including sufficient financial assurance (FA) is crucial to protecting the public's resources. Our recommendations regarding water quality, modeling, and mitigation are highlighted below.

Existing Water Quality Data, Monitoring and Modeling

A considerable amount of data already exists since Greens Creek is an active mine, which provides the opportunity to evaluate and utilize available water quality data to support modeling and evaluate predicted impacts. It will be important to evaluate the existing dataset to ensure that they are of the appropriate type and quality to support intended uses. It will also be very helpful to categorize and synthesize the existing data. We acknowledge that there will be a project website and we believe this will be a good tool for making data, technical reports, and other documents related to the analysis available. To facilitate a user friendly share site, we recommend that the presentation be organized by resource area or project portion in a way that clearly shows which information is most relevant and with documents that are clearly labeled. It would also be useful to provide a summary of the referenced report and data in the EIS and make relevant reports easily available to the public.

A recent environmental audit was provided to us for reference[1] and the executive summary lists findings related to mine activities and site condition along with a significance level rating. The report notes that findings in the report were from the time the audit was conducted and we understand that remedies and adjustments to operations may have already been implemented. The findings in brief include seepage exceeding Alaska Department of Environmental Conservation (ADEC) water quality standards, uncertainty regarding weathering rates, potential instability of waste rock pile, potential contamination of stormwater, and uncertainty regarding long term water treatment. Many of the issues in this report reflect our concerns and we look forward to follow up regarding resolution of findings and related issues, and what mechanisms will be in place to address them. From our understanding, one of these remedies included testing a sulfate reduction technique via carbon amendment of waste rock. We are interested to learn the viability of this option or other options that are being explored to reduce solubility of metals to water resources. We strongly recommend that issues from this report be synthesized in the EIS and further analyzed to protect water quality and other natural resources. Furthermore, the EIS should include details of the monitoring plan that include triggers that would initiate a response and type of management response to avoid environmental degradation from the types of issues listed above.

The analysis will involve modeling to predict future impacts. Although some of it will tier to the 2003 analysis, we believe it is appropriate to conduct additional analysis based on more recent data collected and to fully analyze the effectiveness of reclamation/closure and post closure long term water quality. We would recommend that the EIS use caution in describing absolute outcomes based on modeling. Mathematical modeling used for describing the physical and chemical characteristics of the site and potential impacts includes a level of uncertainty; understanding these uncertainties and associated risks are necessary for informed decision making. We recommend when developing the study plan for the analysis that the plan clearly states the purpose, questions of concern, method, data, and limitations of the model to generate valuable interpretations. We also strongly recommend that an appropriately conservative approach be taken with modeling and that a range of predictive outcomes be discussed (e.g., most likely case, reasonable worst case, and reasonable best case scenarios) that reflect a range of climatic settings and critical hydrogeologic and geochemical input values. Including a reasonable

[1] Environmental Audit of the Greens Creek Mine Final Report, March 2009.

range of outcomes allows the agencies to make better informed plans for mitigation, adaptive management, and contingencies to respond to reasonably foreseeable adverse impacts.

404(b)(1) Guidelines

The EIS should discuss how the analysis complies with CWA Section 404(b)(1) guidelines (Guidelines) and how impacts to waters of the U.S. would be mitigated. The proposed action includes expanding disposal of tailings into waters of the US and the EIS should explore alternatives and demonstrate the three tiered analysis to first avoid impacts, second minimize impacts, and last compensate for impacts. For purposes of the Guidelines it will be important to clearly demonstrate why alternatives that are carried forward are the least environmentally damaging practicable alternatives. "Practicable" does not necessarily mean the most cost effective. We will coordinate with the Corps of Engineers through our review of the 404 permit and alternatives developed to reduce impacts to surface water. The contact for EPA's coordination is Phil North, Wetland Ecologist, (email: north.phil@epa.gov). We recommend that the Corps of Engineers permit be closely coordinated with the EIS process and that the EIS include the analysis related to this permit.

Financial Assurance

EPA believes that financial assurance (FA) is an important element of the project and must be disclosed in the EIS. FA is an important component of the mitigation plan, and disclosing information on the costs and form of FA is essential for the public to understand and comment on the adequacy of mitigation, risks to the environment, and financial risks to the public. EPA believes it is not possible to fully evaluate anticipated effectiveness of the mine and reclamation plan and associated risks to the environment without this type of information.

EPA believes that it is critical to anticipate the reasonably foreseeable range of environmental impacts, and not just the specifically predicted or "expected case", and to have financial assurance mechanisms in place to deal with such impacts. Our experience with mining projects in the northwest[2] shows that a number of mines that have been permitted have developed significant problems or impacts that were not predicted during the NEPA process.

[2] Region 10 Mining Finanical Assurance Strategy, January 2009.

Please see Attachment 1 for our additional detailed scoping comments. Thank you for considering our recommendations and coordinating with EPA early in the NEPA process. We appreciate the opportunity to review reports and preliminary documents so that we can identify issues and assist in the development of the EIS. If you have any questions, please contact me at (206) 553-0205 or via email at mcwhorter.lynne@epa.gov or Alaska Mining Coordinator, Cindi Godsey at 907-271-6561 or via email at godsey.cindi@epa.gov .

Sincerely,

//s//

Lynne McWhorter, NEPA Reviewer
Environmental Review and Sediment Management Unit

Enclosure

cc: ADEC
USACE

EPA Scoping Comments on Proposed
Tailings and Waste Disposal Expansion

General Comments

The EIS should be a stand alone document and include any pertinent information from past analyses and data collection to facilitate a thorough review of the proposed operations and potential impacts. This includes a clear description of the environmental setting; past performance and current water quality issues; detailed mitigation, reclamation, and post closure activities; and existing and proposed mine operations. We understand that a certain level of reference to past reports is necessary in order to be concise. However, we believe it is important to have a current complete analysis that considers current conditions, mine operations as a whole including updated technology and facilities, and any updated permit requirements.

Purpose and Need

The NEPA analysis should include a clear and concise statement of the underlying purpose and need for the proposed action, consistent with the implementing regulations for NEPA (see 40 CFR 1502.13). In presenting the purpose and need for the proposed action, the NEPA analysis should reflect not only the purpose, but also the broader public interest and need.

Range of Alternatives to Protect Water and Air Resources

EPA recommends that the NEPA analysis evaluate reasonable alternatives and mitigation measures to reduce or minimize adverse impacts to groundwater and surface water, with special attention to areas where they may be hydrologically connected, and minimize impacts to air.

We recommend that the range of alternatives consider opportunities to reduce the footprint of disturbance, consider risks posed through each pathway, and incorporate treatment as a principal element to remove contaminants from waste streams to reduce post-closure monitoring and management obligations.

The NEPA analysis should clearly outline the physical design of current and proposed facilities (including waste dumps, disposal areas, water storage facilities), and address key questions related to water movement and water balance.

In evaluating proposed mine facilities the analysis should include an evaluation of methods for determining performance. This type of monitoring would provide an early warning system in case the proposed mine facilities do not conform to model predictions.

Financial Assurance

NEPA provides for the disclosure to the public and decision-makers all information concerning environmental consequences of a proposed action before the decisions are made and before actions are taken. A key component in determining the environmental impacts of a mine is the effectiveness of closure and reclamation activities, including long-term water management.

The amount and viability of financial assurance are critical factors in determining the effectiveness of reclamation and closure activities and, therefore, the significance of the environmental impacts.
The EIS should disclose the estimated cost to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives. The EIS should identify proposed financial assurance mechanisms and demonstrate that these mechanisms would ensure that necessary reclamation work would be completed. The analysis should disclose costs associated with implementing the reclamation plan, as well as costs associated with implementing contingency measures to deal with reasonably foreseeable but not specifically predicted outcomes. This is necessary to inform the public and decision-makers of the financial risk to the public posed by conditions at the site. These financial assurances should be in a form that protects the public interest in the event that a company is unable to implement contingency measures or perform long-term operation and maintenance at a closed mine site.

Modeling

There should be a site-specific conceptual model that describes the system boundaries, time and length scales, hydraulic and chemical characteristics, sources of data and data gaps, and the mathematical relationships used to describe processes. The documentation should include:

- tables of parameter values used in the model,
- tables and graphs of results,
- errors associated with both measured and assumed data, and
- recommendations for further analysis.

We recommend that a discussion on modeling include a clear statement of the management objectives intended to be achieved by the modeling, the level of analysis required to meet the objectives, and uncertainties associated with modeled outcomes. For your reference, please refer to EPA's guidance that provides recommendations for the effective development, evaluation and use of models in environmental decision making[3].

Characterization of Ore, Waste Rock, and Tailings

In order to provide reliable projections of wastewater and solid wastes from the project, the physical and chemical characteristics of ore and wastes waste should be determined. Environmental samples used to support projections should represent a range of conditions that currently occur and that could occur in the future as a result of the project. Waste materials used for environmental projections should be generated from ore that is representative of the material to be mined and related to the mine plan and proposed processing methods. Physical and chemical characterization should be conducted in a manner that provides environmentally conservative estimates of impacts.

Although much of the site characterization has been ongoing and data already exists for Greens Creek, because there is ongoing exploration, it may be helpful to consider the following

[3] *Guidance Document on the Development, Evaluation and Application of Environmental Models* (PDF). EPA/100/K-09/003. March 2009. http://www.epa.gov/crem/cremlib.html

recommendations[4] for characterization once questions in the study plan for geologic and mineralogy setting/aqueous geochemistry:

Whole rock analysis

- Mineralogy
- Drill core descriptions.
- Block model or similar model (a computerized estimate of the quantity and characteristics of ore and waste)
- Available literature on the ore deposit
- Mineral occurrences (e.g., on fracture surfaces, in groundmass, using hand specimens and thin section) with an emphasis on sulfides and carbonates
- Acid-base accounting
- Startup of long-term kinetic testing; possible startup of test pads if sufficient material and access to site are available
- Baseline surface and ground water quality and flows (including springs)
- Potentiometric surface for groundwater
- Hydraulic properties (e.g., hydraulic conductivity, porosity, permeability) of soil, vadose zone, and groundwater aquifers, especially under proposed locations of mine facilities
- Examination of characteristics of similar mines in region/area.
- Hydrogeochemical models for prediction of water quality.

Water Quality/Wetlands

The NEPA analysis should discuss current surface water quality and natural background conditions. Section 303(d) of the Clean Water Act (CWA) requires the States to identify those waterbodies which are not meeting or not likely to meet State and Tribal water quality standards. Impaired water bodies along with the pollutants of concern should be disclosed in the EIS. The NEPA analysis should discuss how a proposed project will identify which waterbodies may be impacted by the project, the nature of the potential impacts, and the specific pollutants likely to impact those waters. It should also include requirements to report those waterbodies potentially affected by the project that are listed on the State's current 303(d) list and whether Alaska Department of Environmental Conservation has developed a water quality restoration plan-Total Maximum Daily Load (TMDL) for the waterbodies and the pollutants of concern. If a TMDL has not been established for those waterbodies impacted by a proposed project, on the 303(d) list, as is the case here, then in the interim until one is established, the analysis must include an evaluation of whether or the extent to which the project would achieve requirements that there will be no net degradation of water quality to the listed waters.

The analysis should evaluate impacts to surface water quality and ground water quality from the proposed operations. The proposed operations include not only traditional mining operations, but also impacts related to on and off-site transportation, of ore, and disposal of tailing. The types and magnitude of impacts may vary with the

[4]Maest, A.S., Kuipers, J.R., Travers, C.L., and Atkins, D.A., 2005. *Predicting Water Quality at Hardrock Mines: Methods and models, uncertainties, and state-of-the-art.* 2005. Prepared for Earthworks. 77pp. Available online at: http://www mine-aid.org/predictions/

project life cycle (construction, operation, temporary shutdown, closure, and post closure).

Wetlands

The NEPA analysis should include a map of surface water, including wetlands, in the project area. The analysis should discuss how many lineal feet of streams, acres of wetlands and what type of wetlands would be impacted by the mine expansion. There should be a discussion of how Clean Water Act (CWA) Section 404(b)(1) Guidelines requirements for wetlands would be met if there are activities that could have direct impact to streams and wetlands, potential impacts to adjacent wetlands or indirect impacts to wetlands such as hydrologic changes due to increases in impervious surface will be evaluated. As preparation of this EIS will also serve to satisfy NEPA requirements of the Clean Water Act Section 404 permit issued by the Army Corps of Engineers, the document should clearly justify the least environmentally damaging practicable alternative.

Water Management and Treatment

The NEPA analysis should explain the current and proposed operations plans for water management and treatment. The EIS should evaluate and disclose the adequacy, reliability, and operational uncertainty associated with proposed water management techniques over the range of operating and climatic conditions. The analysis should characterize chemical compositions and quantities of process waters, mine drainage, storm water, and treated and untreated effluents. This information should be supported by the results of treatability testing. Assumptions used in the analysis should be reasonably conservative.

Marine Environment

The EIS should discuss connected actions associated with the mine that may have potential impacts on the marine environment (e.g., proximity of facilities to Hawk Inlet). The EIS should discuss past and current monitoring of the marine habitat and water quality. This includes discussing any past or potential impacts to the "Habitat Areas of Particular Concern" as defined in the 2003 final EIS (e.g., kelp beds) and essential fish habitat.

Air Quality

The EIS should include baseline air quality data prior to mine operations as well as data from existing monitoring reports. The EIS should identify any anticipated issues based on past practices and what mitigation would be used. The EIS should also disclose current operation plans used to minimize/restrict air emissions and fugitive dust and how they may be revised for the expansion.

It is reasonable to expect that construction of the mine and ongoing mine operations will result in greenhouse gas (GHG) emissions. These emissions should be disclosed in the EIS (metric tons CO_2 equivalents/yr). We recommend implementing measures to reduce GHG emissions and offer the following for consideration as components of a construction air pollutant emissions control plan.

- Evaluate the use of available alternative engines and diesel fuels:
    - Diesel engines that meet the proposed EPA 2007 regulation of 0.01 g/bhp-hr (grams per brake horsepower hour)
    - Diesel engines outfitted with catalyzed diesel particulate filters and fueled with low sulfur (less than 15 ppm sulfur) fuel
    - Fueling on-site equipment, e.g., mining equipment, with lower sulfur highway diesel instead of off-road diesel fuel
- Install control equipment on diesel construction equipment (particulate filters/traps (DPTs), oxidizing soot filter, oxidation catalysts, and other appropriate control devices to the greatest extent that is technically feasible.) Different control devices may be used simultaneously.
- See www.epa.gov/otaq/retrofit/index.htm for verification of technology retrofit emissions reductions related to any project mitigation measures.
- Establish idling limit (e.g., 5-10 minutes per hour).
- Prohibit any tampering with engines and require continuing adherence to manufacturers' recommendations.

Transportation of Hazardous Materials and Concentrates

A recurring problem at mine sites is related to transportation incidents involving hazardous materials. The NEPA analysis should characterize risks related to transportation incidents, and describe mitigation, response planning, and monitoring programs to mitigate for expected problems.

Roads

Road construction and reconstruction are of key concern to EPA because roads can be a large contributor of sediment to streams and interrupt the subsurface flow of water, particularly where roads cut into steep slopes. In addition, roads and their use contribute to habitat fragmentation, wildlife disturbance, the introduction or exacerbation of noxious weeds, and increased fire danger from recreational activities. The EIS should describe in detail the location of existing roads and proposed construction of roads and how stormwater would be managed to reduce impacts to surface water.

Monument Value and Inventoried Roadless Area (IRA)

The EIS should discuss the setting of the Admiralty Island National Monument and how activities proposed do not affect this designation outside the mine boundary. The EIS should also disclose any reasonable foreseeable activities that would encroach on the intrinsic and ecological values of the monument.

The EIS should disclose the IRAs surrounding the project and how IRAs will be maintained. We strongly recommend maintaining these areas and discussing the Forest Plan standards and guidelines as it relates to this portion of the Tongass and this project.

Fish and Wildlife

We recommend that the NEPA analysis clearly discuss and list in a table format any ESA listed species that occur in the project area. This section should be linked to habitat discussion and should include a discussion of what activities are being proposed to avoid impacting listed and sensitive species. We also recommend that the EIS include the biological evaluation and any terms and conditions recommended by NOAA and USFWS.

Monitoring

The NEPA analysis should describe project monitoring in some detail. We recommend as a general rule that the level of effort afforded monitoring be commensurate with the complexity of the project and the risk to and sensitivity of the affected environment if a project is permitted and/or approved. As a first step, we recommend that the NEPA analysis clearly define the goals and objectives of monitoring, and present an overall monitoring strategy for the project. Second, the NEPA analysis should provide enough detail on the monitoring program for reviewers to evaluate whether the goals and objectives of monitoring will be achieved. This can generally be satisfied by providing summary information on monitoring (including a list of measurement parameters, methods, locations and frequency), data analysis, and reporting. In addition, we recommend that alternatives include clear requirements for regular analysis and reporting of data to oversight agencies, and include a requirement that the operator submit a full sampling and quality assurance plan for agency approval. The NEPA analysis should discuss who will conduct monitoring, the frequency and how monitoring will direct management decisions.

Adaptive Management Planning

The NEPA analysis should describe the strategy for responding to unforeseen circumstances at the site. Adaptive management and contingency planning are particularly important projects that carry a high level of uncertainty in predictions of environmental consequences. The strategy should include "trigger levels" (e.g., exceedance of ecological benchmarks) or observations (e.g., statistically significant trends in indicators, permit violations, water balance problems, changes in discharge or chemistry of springs/seeps) that would set in motion a follow-up action. This strategy or plan should be described so that reviewers may comment on its adequacy. This type of plan when coupled with the monitoring program is necessary to mitigate for uncertainties and risks associated with predictions of environmental outcomes, and will provide an early warning system of unexpected outcomes. Such plans are necessary to ensure that post-mining land use objectives can be achieved and sustained in the future.

Cumulative Impacts

A cumulative effects analysis should be done for potential impacts to natural resources due to potential foreseeable actions (e.g. expansion of mine on private land or other ground disturbing action that could natural resources) regardless of what agency (Federal or non-Federal) undertakes the action (40 CFR § 1508.7). We recommend that projects covered by the proposed action utilize the best available science through

effective watershed hierarchy and a watershed approach when identifying, quantifying and mitigating cumulative impacts. EPA has issued guidance on how we are to provide comments on the assessment of cumulative impacts[5]. The guidance is a good tool to assess the adequacy of the cumulative impacts assessment in five key areas. EPA tries to assess whether the cumulative affects analysis:

1. Identifies resources if any, that are being cumulatively impacted;
2. Determines the appropriate geographic (within natural ecological boundaries) area and the time period over which the effects have occurred and will occur;
3. Looks at all past, present, and reasonably foreseeable future actions that have affected, are affecting, or would affect resources of concern;
4. Describes a benchmark or baseline;
5. Includes scientifically defensible threshold levels.

We recommend that Forest Service review the guidance and include requirements in the NEPA analysis to assure these areas are addressed in the cumulative effects analysis for proposed projects.

Climate Change

The EIS should describe the current conditions related to climate and future predictions of climate shifts in the Northwest. Potential effects of climate change may include changes in hydrology, sea level, weather patterns, precipitation rates, and chemical reaction rates. CO_2 concentrations also lead to preferential fertilization and growth of specific plant species. The cumulative effects analysis should include a discussion on potential changes in precipitation, stream flow, changes in vegetation and wildfire frequency. A key component of site restoration involves success of revegetation to reduce erosion and impacts to the surrounding environment. We recommend that adaptive management be built in to post closure monitoring and management so that measures can be taken in response to potential changes in site conditions that results in mass wasting and affects to COPC source control measures.

Consultation with Native American Tribes

The NEPA analysis should not only discuss the historical structures that exist in the project area but also cultural resources and impacts to Native Americans. The NEPA analysis development should be conducted in consultation with all affected tribal governments, consistent with Executive Order (EO) 13175 (*Consultation and Coordination with Indian Tribal Governments)*. EO 13175 states that the U.S. government will continue to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights. Documentation of these consultations should be included in the document prepared under this action. Consistent with the July 28, 1999 memorandum from the Council on Environmental Quality (CEQ) to Heads of Federal Agencies, we strongly urge the Services to consider inviting affected Tribal governments to participate in the NEPA analysis development process as cooperating agencies. This

[5] *Consideration of Cumulative Impacts in EPA Review of NEPA Documents,* http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf .

would provide for the establishment of a mechanism for addressing intergovernmental issues throughout the planning process. The NEPA analysis should identify Tribal concerns and issues and discuss how these will be mitigated.

Document Page Number	Line Number	Comment	Commenter (optional)
iii	Summary 2nd par	Suggest edit "lead and zinc mine" to multi-metal or adding silver and gold	EPA
iii	Summary 2nd Par	Add Cannery Creek in list of drainages.	EPA
iii	Summary 2nd par	Change "With the exception of Fowler Creek, this drains…" to "With the Exeption of Fowler Creek, which drains…"	EPA
iii	Summary 3rd par	Change "The action is needed based of" to "The action is needed based on the continued…"	EPA
iii	Summary 3rd par	Reword sentence about HGCMC prefer to plan strategically. Prefer over what? Perhaps change to them strategically planning and take out prefer.	EPA
1-3	36	Is the method to separate between what is waste rock and what is glacial till identified in the document? Since glacial till will be used in reclamation would want to make sure there's a protocol that has staff have been trained to ensure waste rock isn't used in reclamation. The process for this should be disclosed.	EPA
1-3	1	Should "now" be "then"?	EPA
1-6	3	What is the reference to (from 2010)? Is it from a document from HGCMC's in 2010. What makes the reference point be 2010?	EPA
1-6	29	Include date that scoping was initiated. "…comment through the scoping process (initiated October(?) 2010)"	EPA
1-8	Footnote 1	Reduce font size like in Footnote 2	EPA
1-12		Other Issues: The EIS should list that an issue identified is the lack of long term water treatment bonding. This has been discussed multiple times and agreed upon.	EPA
1-13	24	Add Title 83 to the list - these are the APDES regulations	EPA
1-15	35	of recreation, socioeconomic impacts	EPA
1-19	37 - 40	What component needs a Section 10 permit? If none, then does this have to be here?	EPA

1-21	31, 32 & 33	If it is "The ADNR in line 31 then should it be "the ADNR" and "the ADEC" in the following lines?	EPA
1-22	3	Isn't the State of Alaska with ADNR in the lead the cooperating agency and not each individual Department?	EPA
1-22	16 - 17	. . . over permitting, compliance and enforcement under Section 402 . . .	EPA
1-22	19 - 20	Greens Creek is not a new source	EPA
1-22	29	Effective date has been delayed - check with ADEC	EPA
1-22	42	Isn't the State of Alaska with ADNR in the lead the cooperating agency and not each individual Department?	EPA
Chapter 2		Throughout the document there are references to how much additional capacity is needed for tailings and waste rock. It is confusing to go back and forth to get a clear picture. There also appears to be an error. Pg 2-5 lines 2-6 states that the proposed action calls for an expansion...to a total capacity of about 30 million tons; however the proposed action from previous documents is for 15 million. Please rectify this discrpency. The EIS should include a table that illustrates the amount of tailings and waste rock and capacity used and needed over time including the proposed amount.	EPA
Chapter 2		2.5.2, Paragraph 2 includes a brief description of an alternative that expands the existing tailings storage facility to the northeast and the southwest, reducing the amount of wetland fill near Tributary Creek. However, the justification for not carrying this alternative forward is inadequate. There is no mention of extending the tailings facility to the northeast and no explanation of why a buttress is needed on the southwest. It is important that the feasibility of this alternative be fully explained because this alternative appears to involve the least quantity of waters of the United States, as required by Section 404 of the Clean Water Act. Without adequate and convincing explanation of why this arrangement should not be carried forward, EPA will recommend that the 404 process continue to consider this alternative as viable.	EPA
2-1	23	In the section titles, there is an underline after the title that does not appear after the titles in Chapter 1 (this happens in Chapter 3 also)	EPA
2-2	4	. . . under an APDES permit.	EPA

2-2	6	. . . at the mill treats water used in the milling . . .	EPA
2-2	32	. . . TDF reaches its . . .	EPA
2-3		States that current tailings and waste rock disposal result in the 15 approved TDF reaching its capacity in 2014 (see Table 2.3-1 and Figure 2.3-1) Table 2.3-1 does not discuss amount of tailings related to acres disturbed and therefore, it is not clear why capacity will be reached in 2014. For clarify, please provide a table with unit of amount of material to be placed through 2014, how much capacity is currently available, and how much would need to be available for this proposal. Also, include a detailed narrative explaining why there is a need to have space available in 2014.	
2-5	25 - 26	The information about the new water treatment plant is already in lines 17 - 18	EPA
2-5	30-32	Refers to applicable sediment control measures. Include reference to BMPs required and suggest listing them in a section of BMPs and mitigation.	EPA
2-5	37 - 38	Table 2.3-1 doesn't seem to summarize the disturbance during the first 10 years unless all of the disturbance takes place in the first 10 years.	EPA
2-7	Alt C blurb	Alternative C: New TDF located . . .	EPA
2-11	44	"water treatment plant and remain opperational late into.." Should read "water treatment plant to remain operational late into…"	EPA
2-11	4	The purpose of the pad is to . . .	EPA
2-11	27	Is the design meant to be as described in line 1 - 6 on this page?	EPA
2-11	1	This implies that the water treatment plant would only be operated through year 30. What would happen with water treatment after that?	EPA
2-15	21 - 23	Are the storage areas in line 21 the same as reclamation material storage sites referenced in line 23?	EPA
2-15	27	States that reveg of existing TDF would happen "as soon as possible following tailings placement". The term as soon as possible does not include any requirements. This should be changed to reflect the agreed upon reclamation schedule.	EPA
2-15	37	Is there any co-disposal of new waste in the TDF or does it all currently	EPA

		go to Site 23?	
2-16	4	. . . and mixed with liquid reagents to form a slurry. The slurry is . . .	EPA
2-16	14	Is the entire TDF lined? Lines 21 & 22 on page 3-29 indicates that not all was lined but perhaps it is now?	EPA
2-16	26	Regarding the statement "The operator classifies waste rock based on its geochemical reactivity". The process by which the operator makes this determination needs to be clarified.	EPA
2-16 and 2-17		Groundwater. On page 2-16 lines 13-16 states that the liner prevents groundwater from flowing into TDF and prevents leaching from TDF. However, on page 2-17 lines 40-42 refers to groundwater contact water is a combination of infiltration through the TDF. These statements seem to be in conflict. The EIS should clarify this and clearly describe the water management plan related to groundwater.	EPA
2-17	3	how does co disposal of waste rock lowers the oxidation rate in the waste rock?	EPA
2-17	18	. . . discharged under an APDES permit.	EPA
2-17	26	. . . at the mill treats water used in the milling . . .	EPA
2-17	31	Outfall 001 should be 002	EPA
2-17	34	Outfall 001 should be 002	EPA
2-17	43	Any indication of how "long" long might be?	EPA
2-18	29-32	These materials are tested for leachability and acid-generating capacity…" Include the criteria for the materials described as "clean" (or refer to where they can be found.)	EPA
2-19		The document should discuss inventoried roadless areas and if there would be any impacts to this designation.	EPA
2-19	35	. . . under Alternative D.	EPA
2-20	11	The existing mitigation measures listed further seem to apply to both water and wind so should wind be deleted here or should "surface water diversions" be deleted from line 13?	EPA
2-21	Section 2.4.8.1	How can the reviewer/public access the GPOs? Since the last EIS was almost 10 yrs ago, this EIS should include in an appendix or summarize pertinent information in the document.	EPA

2-21	38-42	States that detailed rec plan will be developed at closure. It seems that a detailed reclamation plan should be developed and approved by the Forest Service before the updated POO is approved. If this is in phases, then the EIS should state what aspects of the rec plan would need to be approved prior to issuance of the ROD.	EPA
2-22	16	This part is confusing because it sounds like the layers above the capillary break are meant to drain but the layer above is a compacted layer that is meant to be a barrier to drainage. Should the minimal amount of water expected be highlighted here?	EPA
2-22	39	Replace "discharge" with "flow"	EPA
2-22	20	Text refers to mine waste rock to be used in lower capillary break. Again, refer to criteria for use of waste rock classified as acceptable for this use.	EPA
2-24	36	. . . coordinate disposal to either surface or underground operations.	EPA
2-25	1-5	Is sulfuric acid transported as a liquid or is it in a solid form that is reconstituted? If it is in liquid form then there is no comment on this section but if it is in solid, what difference is there between this argument against acid and the argument that people make against cyanide that everyone dismisses because it is transported in solid rather than liquid form so the risk is substantially lower.	EPA
2-27	Section 2.6.3	States that "other" mitigation measures may be beyond regulatory authority. It is our understanding that the FS can require mitigation prior to approval of the plan. The EIS should explain what gaps exist for mitigation since this suggests that there are others that could be implemented. Also, what mitigation would be beyond regulatory requirements?	EPA
2-30	Table 2.7-1	Could the footnoted information denoted by the * be moved to just below the *'ed cells so it isn't at the end of the table, 4 pages away?	EPA

2-30	Table 2.7-1	Regarding: "Elevated metals levels in lichens…". Lichens are often selected as biomonitors because they do not uptake metals from soil/substrate, but instead obtain contaminants from direct absorption of wet and dry deposited metals (Grangeon et al, 2012; Loppi et al, 2000). As such, the lichens can be used to obtain a representative measurement of impacts from air pollution, but this does not indicate that lichens are of particular concern or are uniquely being impacted. The impacts of metals released to the air, in particular mercury, would be most pronounced when deposited to wetlands/peatlands in the area. The reason being, that these location are where mercury can be transformed to methylmercury, which has greatly increased toxicity and can bioaccumulate. If lichens are experiencing elevated levels of metals, then it can be assumed that the surrounding terrestrial system in general has elevated metal deposition. Questions that should be addressed: =--which metals in particular are elevated? =--over what spatial area are the metals elevate =--how elevated above background concentrations are the lichens? =--are lichens an important food source for area wildlife?	EPA
2-31	Table 2.7-1	Regarding: "Need for long term water treatment". Clarification is needed as to what "long term" indicates as well as what type of water treatment might be necessary (i.e. passive or active). Upgrades to the water treatment facility at year 30 are planned for Alternatives B, C, and D. The nature of these upgrades should be indicated. Is it expected that additional upgrades will be required every additional 30 years even after mine closure?	EPA
2-31	Table 2.7-1, end of surface water section	Under "impact" all Alternatives have "yes" under "need for long term water treatment. However, on page 3-31, text says treatment will be needed for "several years" after closure and "perhaps in perpetuity." These terms seem to conflict, though all are on the vague side. There needs to be a more specific explanation of what the expectations are for future water treatment needs.	EPA
2-31	Table 2.7-1, end of surface water section	Include an additional row for WQ standards or impacts with more technical detail than yes for long term water treatment. For example, refer to meeting WQ standards and what constituents are of concern or	EPA

		would potentially exceed.	
3-1	4	Capitalize the I and S in "impact statement"	EPA
3-3	Multiple	The results of lichen monitoring plots indicate that levels of mercury are elevated (Dillman et al, 2010). Numerous studies have shown that mercury can volatize directly from surfaces under ambient environment conditions (summarized in Eckley et al, 2011). As such, fugitive source of mercury release will not be limited to dust entrainment, but can be emitted directly into the gas phase. Due to the relatively low mercury concentrations reported from Greens Creek materials, the fugitive emissions from direct volatilization may be insignificant, however, it is possible that these emissions are contributing or are responsible for the elevated levels observed in the lichen plots. As such, they may not be able to be mitigated through dust abatement practices.	EPA
3-6		Air- identify which model(s) were used to predict air quality impacts. Dust or Mobile model sources?	EPA
3-7	8	If the source of the elevated lichen concentrations is believed to originate due to fugitive dust releases, is there a difference in wind conditions between the existing TDF and the one proposed to the north?	EPA
3-10	7-9	States that the extent of elevated metals from fugitive dust "should" be characterized… This should be required. Examples like this exist throughout the document. These should be required for monitoring and include contingency measures to respond to impacts.	EPA
3-10	15	"and other metals found lichens…" should read " and other metals found in lichens…"	EPA
3-12	13	Should it be "by" 2020 rather than "in" 2020?	EPA
3-13	14	Why the specific focus on lead as opposed to other metals?	EPA
3-13	18	How can a stockpile be a deeper quarry? Should "as a deeper quarry" be "and a deeper quarry" as is stated on Page 3-93 line 16?	EPA
3-19	19	Should "Catham " be "Chatham"?	EPA
3-21	14	What is the connection between cover stability and Corps guidance for	EPA

		earthen levees?	
3-23	28	It is stated that the composition reported in Lindsay et al, 2009 is "typical". Is additional data available that can show 1) that the Lindsay et al, 2009 data are spatially representative of the tailings as a whole; and 2) that in the ensuing 30-50 years, the ore and wasterock being mined will have similar mineralogical compositions as presented in this EIS? The Lindsay et al, 2009 data represent pure tailings material, but the proposed plan is to co-dispose of waste rock with the tailings. How will the co-disposal of waste rock change the mineralogical composition relative to what is presented in Table 3.4.-1?	EPA
3-23	23	Quantitative mineral composition data such as is presented in Table 3.4-1 was not presented in the 2003 EIS. As such, without supporting information, it is not possible to evaluate the statement that conditions are "essentially unchanged".	EPA
3-23	Table 3.4.-1	The mineralogy is an important variable in determining ARD potential. In order to evaluate the data and identify uncertainties, it is critical to understand the representativeness of the data collected. From reading Lindsay et al, 2009, it can be learned that the data presented originates from 5 boreholes sampled in 2005. Four of the boreholes were located along a west-east transect and one additional one was located in the SW corner of the tailings. Lindsay et al, 2009 states that " Mineralogical investigation was performed on sub-samples collected from refrigerated core samples". However, its not clear how it was determined which depths were chosen for the subsamples and how it was determined which cores were sampled (if they were not all sampled)? The number of samples (n=12) and the standard deviations of the averages (as shown in Lindsay et al, 2009) should be provided in this table. While the percent deviation (~12%) is low, in order to interpret this correctly, the reader needs to understand how the 12 subsamples from the cores were collected to ensure representativeness and if there were any significant differences associated with depths and locations with the tailings.	EPA
3-24	22	The rate at which pyrite oxidizes is also influenced by the temperature. Have temperature profiles from within the existing tailings been obtained?	EPA

3-24	19-20	The resulting acidity will be neutralized until carbonate minerals are consumed. At that point, ARD may form. Explain why the production of ARD after the carbonate minerals are gone is uncertain. Isn't it a matter of "when," rather than "if"? Or do you mean that the "drainage" part may or may not happen, since drainage is more controllable than acid development?	EPA
3-25	General	From the 2003 EIS: "Static testing of tailings from the Greens Creek deposit (Figure 3-15) indicates that they have the potential to become acidic. However, owing to the abundance of calcium carbonate and dolomite in the samples (generally ranging from 10 to 60 percent), a long period of weathering, estimated at more than 10 to 33 years in lab tests conducted on siliceous waste rock samples, would have to occur prior to development of acidic conditions." These predictions are from data presented in reports form 1993 and 1994 (Vos); which continue to be referenced in the 2011 EIS. Comment: Given that the mine has been in operation for over 20 years, the accuracy of these original predictions should be discussed in light of current conditions. Much of the geochemistry data presented in the 2011 EIS is over 15 years old (e.g. Fig 3.4-1)-contemporary data should also be presented. The accuracy of the predictions versus current conditions can be used to evaluate the robustness of the future predictions.	EPA

3-25	Figure 3.4-1	The data presented in the Figure are listed as “grab samples”, implying that only a small mass of sample was collected. How was the location of the grab samples determined to ensure that the results are spatially and temporally representative of the tailings generating from the mine’s operations? --Comparing the data collected in 1994 to the data collected in 1999, there appears to be a shift towards more AGP from ~360 (1994) to ~450 (1999). This apparent difference in median AGP between yearly sampling implies that the spatial and/or temporal variability in the tailings is larger than what was captured by the limited number of grab samples collected. Furthermore, the SMI 2000 data has a large AGP range--from ~310 to 580 t/1000t. Given this spatial and temporal variability, a statement needs to be included that justifies that 6 samples can accurately portray the AGP of the tailings. --The data in this figure ranges from 1990 to 1999. More recent data has been collected though and is presented in Lindsay et al, 2009. From Lindsay et al, 2009, the data appears to have a lower NP than the data presented in Figure 3.4.-1 (Lindsay et al, 2009 average ~100 kg $CaCO_3$ t^{-1} ; Figure 3.4-1 average NP ~ > 200 The data in this figure ranges from 1990 to 1999. More recent data has been collected though and is presented in Lindsay et al, 2009. From Lindsay et al, 2009, the data appears to have a lower NP than the data presented in Figure 3.4.-1 (Lindsay et al Why is more recent data (e.g. from Lindsay et al 2009) not included in this figure? From pg 23 of Appendix A from the 2003 EIS, it states that the ANP of the tailings is greater than the ANP of waste rock. Therefore, the ANP of the co-disposal scenario may have a lower potential for acid neutralization than is represented from the data presented on the tailings materials alone in the 2011 EIS. Both points made above suggest that the data in the Figure may provide a picture of ARD potential that is biased low. This should be	EPA

		addressed.	
3-25	14	Regarding: "The rate of sulfate release for Greens Creek Mine tailings through an 18-month study changed from a high of 374 mg/kg/week for the first 6 months to 37 mg/kg/week for the next six months, decreasing to 25 mg/kg/week the final six months (USFS 2003)." Comment: When this data is presented in the 2003 EIS it states that "Vos (1990) conducted both humidity cell and column tests on a sample of Kennecott tailings containing 12.1 % sulfide sulfur". Through S speciation experiments, Lindsay et al, 2009 report average sulfide contents of 10%; however, they acknowledge that this is likely an underestimation due to incomplete removal by pyrolysis. From Table 3.4-1 and line 28 on page 3-23, the typical composition of the tailings is 34% pyrite (i.e. iron sulfide), which would equate to a sulfide sulfur content of 18±2% (assuming 53% of FeS2 is sulfide sulfur; the standard deviation obtained from Lindsay et a., 2009). This percentage may be even higher under future co-disposal conditions. As such, the results presented on lines 14-	EPA

		16 need to be contextualized for the reader indicating that 1) they are based on a single sample obtained from the tailings over 20 years ago; 2) the sample may not be representative of the S content of current and future conditions of the tailings (i.e. the average sulfide sulfur content of the tailings may be higher than 12.1% and as such the sulfate release rates presented may be biased low); and 3) Vos 1990 should be cited as the origin of the data and not the 2003 EIS.	
3-25	22	A reference that explains the details of the field test plots is needed -- presumably this is from the ES&T paper by Lindsay et al, 2009?	EPA
3-25	24	Numerous studies have identified that sulfur reducing bacteria (SRB) are the principle source of methylmercury production (summarized in Ullirch et al, 2001) and recent results have shown that methylmercury production can be stimulated through additions of organic materials (Mitchell et al, 2008). Even if inorganic mercury is present in the tailings at low/near ambient levels, the impacts of increasing methylation rates could have significant impacts of methylmercury levels in water exported from the tailings and should be noted as potential environmental impact of increasing SRB activity.	EPA
3-26	7-8	The origin of the input data (grain size, DO in contact water, pH) that was used in the equations developed by Williamson and Rimstidt needs to be identified? As only one output value is presented here (200 mg/kg/week); can it be presumed that only 1 input value was used for the grain size, DO content, and pH? From Lindsay et al, 2009, it appears that the pH in the tailings can range from <7 to >8 from different depths at a single location. How was it determined which input pH value to use in the equation? How was it determined that the 200 mg/kg/wk value is spatially and temporally representative of the tailings current and future conditions?	EPA

3-26	16-17	Need to provide data or a reference that supports this statement.	EPA
3-26	26-28	Regarding the statement that the "near surface" seeps have relatively elevated levels of several trace elements. Please specific what is meant by "near surface". Looking at the data from Figure 5 in Lindsay et al, 2009, some elements were most elevated in the top 1 m (e.g. Mg, Zn, Mn, Ni, Tl); however other elements had low concentrations near the surface and increased with depth (up to 4 m) (e.g. cu, Se, As, Sb). I assume that all these fall within the "near surface" value in the table, but exactly at which depth the measurements were conducted can make a big difference and should be addressed.	EPA
3-26	Table 3.4-2	The 2003 to 2009 HTC prediction of the long term rate of pyrite oxidation are almost an order of magnitude different (25 to 233 mg/kg/wk). The cause for the difference in predictions should be addressed.	EPA
3-26	5-8	Is the difference in pyrite oxidation rates described here attributed purely to the difference between the ambient temperatures (field and lab) or are there other factors at work? Add brief discussion to text.	EPA
3-27	Table 3.4.-3	Some measure of dispersion around the mean (if it can be assumed that these are averages-it is not explicitly stated) and the number of samples collected should be included. From Lindsay et al, 2009 Figure 5, between sampling in 2005 and 2007 at the same locations, there was significant temporal variability in some of the tailings pore water samples. For example, Cu in 2007 was ~0 and in 2005 was ~200 ug/L; similar results were noted for several other geochemical measurements. Furthermore, there was significant variation of the porewater with depth (e.g. Cu was ~0 near the surface and ~200 at 4 m depth). As such, there is substantial spatial (vertically for sure and perhaps horizontally-not measured in Lindsay et al, 2009) as well as temporal variability. Therefore, collecting a representative sample will be difficult and needs considerable attention. Please describe how you ensure that the data in Table 3.4.-3 is spatially and temporally representative. From reading Condon (2011), the data appears to be from 2001 and was collected from a single location on a one day (though this is not entirely clear). If a more robust spatially and temporally dataset exists it should be	EPA

		presented. As it stands the data presented in Table 2.4-3 is just a snapshot of conditions and the reader cannot determine the representativeness of this data or understand its variability.	
3-27	Table 3.4-3	For Hg there is a footnote 14 that doesn't seem to refer to anything.	EPA
3-28	4	Delete "trials"	EPA
3-29	16	Is there more than one way to blend the relative proportions to obtain the concentrations in Figure 2 in Condon, 2011?	EPA
3-29	5-6	a net acid generating condition, ARD, is unlikely for the pile This might be the place to say that ARD is likely to develop locally, since that is the distinction being made here (locally vs. the pile as a whole).	EPA
3-29	19	(w)ater reporting to a monitoring well from the tailings themselves Does this mean a monitoring well within the tailings?	EPA
3-29	19-22	Calibration percentages-surely this is a non-unique solution. Need to say more about how these were derived-most readers will not want to delve into the modeling report.	EPA

Geochem and Water Quality impacts		Throughout the document there are different conclusions re long term water treatment. Line 20 states perhaps in perpituity. Table 2.7-1 says YES. Section 1.7 states that there is a need to investigate long term stability of tailings (under water quality issue 1). Also the potential impacts per alternative in the water quality section makes no mention of long term impacts and only discusses impacts to flow in Tributary Creek and pond capacity. The summary briefly mentions that a permitted discharge may be required for a substantial amount of time after closure. Appendix A states that long term water monitoring many years after closure (what is many?) The EIS is confusing related to this issue and should be consistent. It should clearly identify the need (probabity or likelihood?) for potential water treatment in perpituity due to potential long term impacs.	EPA
3-31	18-20	Though ARD may not buildup, Lindsay et al, 2009 state that even though near neutral pH conditions are expected in the future " elevated concentrations of SO4, Fe, Zn and other elements may persist under near-neutral pH conditions". Is this the reason for the need for water treatment post closure? A statement similar to the one above from Lindsay et al, 2009 should be included in the EIS to identify that even at neutral pH conditions, there can still be elevated levels of several elements/compounds of potential environmental concern.	EPA
3-31	19 - 20	Table 2.7-1 says that "long term" treatment is required but here it says several years but maybe forever, Page 3-49 line 18 says a "substantial period" but maybe forever and page 3-88 says "as long as necessary" and again a "substantial period" perhaps forever If the amount of the bond is meant to run a facility if the company walks away from a site, is treatment included in the current bonding?	EPA
3-31	28	Is the "Tailings site" the same as the TDF?	EPA
3-31	33	. . . at approximately sea level.	EPA
3-31	20	… (A)lthough water draining from the facility would require water treatment for several years after closure and perhaps in perpetuity That is a very large range-between "several years" and "forever." When do you anticipate that it would become clear which would be the case?	EPA
3-38	Table 3.5-2	TDS and Sulfate are listed in this table twice.	EPA

3-42	1-11	Why isn't sanitary wastewater listed?	EPA
3-42	23	Suggest deleting "at the Pond 7 WWTP"	EPA
3-44	31	Muscles should be "mussels"	EPA
3-49	4	What is the basis for 810? The Table says 180 so which should be changed? This also brings the question if there are other errors in the table or text re water quality predictions.	EPA
3-50	Table 3.5-7	Please designate total recoverable or dissolved	EPA
3-50	Table 3.5-7	Footnote 3 - the freshwater WQS for Hg is the aquatic life chronic criterion that is in effect for CWA purposes since EPA did not approve the 2003 revision submitted by ADEC (the human health for consumption of water and aquatic organisms is 0.050 ug/L)	EPA
3-51	Table 3.5-8	See Footnote 3 comment for page 3-50	EPA
3-52	Table 3.5-9	See Footnote 3 comment for page 3-50	EPA
3-53	Table 3.5-10	See Footnote 3 comment for page 3-50	EPA
3-53	10	. . .the TDF is captured . . .	EPA
3-54	37	See comment for page 3-13 line 18	EPA
3-56	5	North what? Is it "to the north" or "north of [something]"?	EPA
3-57	23 - 25	Although there would be complexities, should it be noted that constructing a new TDF could take advantage of advancements in technology made since the first TDF was constructed?	EPA
3-60	3	Should "at least slightly" just be "slightly"?	EPA
3-65	4	Sulfate is a drinking water standard	EPA
3-67	16	. . .through at least 2014.	EPA
3-68	30	blowing of should be "blowing off" and "would" should be "could"	EPA
3-68	35	See comment for page 3-13 line 18	EPA
3-69	21	See comment for page 3-68 line 30	EPA
3-70	4	A reduction in the amount . . .	EPA
3-73	7	Delete "areas"	EPA
3-76	1	Delete "," after "aspera)" because sole yellowfin and rock both describe sole	EPA
3-81	10	. . . debris conditions in this system . . .	EPA

3-84	Table 3.7-6	Note - since no data is underlined, why say that underlined values are higher?	EPA
3-85	Table 3.7-7	Delete automatic header row	EPA
3-85	Table 3.7-7	Shouldn't the average values under S-5N and S-5S all be underlined since they are all higher than the per-production averages?	EPA
3-85	3 & 4	ERL is used in line 3 before it is short-cited in line 4	EPA
3-86	27	. . . at station S-1 . . .	EPA
3-88	38	. . . and discharge to Hawk . . .	EPA
3-89	3	In keeping with what the rest of the document is saying about the potential for long term treatment, this section forgets to mention the possibility of "into perpetuity."	EPA
3-92	9-10	. . . stream segments would be . . .	EPA
3-92	13	. . . was limited to . . .	EPA
3-92	23	. . . runoff could not be restored to . . .	EPA
3-93	1-13	Earlier in the document, there was something about the inlet fully flushing every 5 tidal cycles. Does this have any impact on what is said in this section?	EPA
3-93	7	. . . toxic concentration thereby reducing . . .	EPA
3-93	19	Insert a period (.) after "channel"	EPA
3-94	24	Should "resources" be "resource"?	EPA
3-94	27	Additional what? Roads?	EPA
3-113	12	sphagnum is capitalized and italicized on page 3-116 line 10, should it be here?	EPA
3-117	10-12	Some wetlands impacted by the construction of the TDF expansion and related facilities would be restored after final closure of the mine. Is this what this sentence is trying to say?	EPA
3-118	13	Suggestion - delete "following closure"	EPA
3-118	17	. . . shrubs to reestablish.	EPA

3-119	Table 3.10-5	The acres of disturbance add up to only 113.1. The note below indicates that an additional 1.1 acres were not assigned to a specific type so that adds up to the shown total of 114.2. BUT both Table 3.10-4 and 3.10-6 have the same type of note except the acres of disturbance shown add up to the total shown in the Table. These Tables should use consistent methodology.	EPA
3-120	23 - 25	Should something be said about the wetlands being impacted being mainly out of the Monument in Alternatives C and D?	EPA
Appendix A		States that long term water monitoring may continue many years after closure. What is the basis for many years and what does this mean? Should also clarify that it is not only monitoring but long term operation and maintenance. There should be a discussion on what activities would be associated with long term O&M (e.g., managing water treatment). As it reads currently the document does not stress the significance of potential need for long term water treatment and how the Forest Service will require this or calculate. The EIS process should include the current proposal and what that bond estimate would be including long term costs.	EPA
General		Quarries: Alternatives B,C, and D all involve obtaining rock from quarries that contains pyrite. Is the contact water at the quarry sites contained and sent to the water treatment facilities?	EPA
		Hydrology: When discussing the infrastructure to control runoff, flow, and drainage outside of the TDF, is the infrastructure designed to capture surface as well If the series of drainage ditches, etc capture and divert sub-surface flow, how does this flow alteration impact hydrological conditions in area streams? In streams located within the mine's watershed, what proportion of the flow originates from surface versus subsurface sources? as subsurface flow?	

		Microbial activity: Microbial activity is an important variable in determining the potential for ARD, however the EIS does not discuss any measurements of microbial activity in the TDF. Though such measurements have been conducted at Greens Creek, Lindsay et al, 2009 perform microbial enumerations from the tailings samples. Their results identify the presence of sulfur oxidizing bacteria (SOB), which were spatial variable between and within boreholes. Discussion of the influence of microbial activity on ARD from the tailings should be included in the EIS, as well as in the model presented in Condon (2011).	
		Variability and representativeness: Throughout the Geochemistry section, the number of samples collected to characterize the mineralogy should be based on the variability of the materials being mined such that all geologic, lithologic and alteration units associated with the area being mined are proportionally represented. A statement justifying the number of samples collected needs to be included in the EIS and model description that indicates that the data presented is representative of current and future tailings composition.	
		Condon (2011) Reference: The model presented in Condon 2011-are the tailings, porosity, conductivity, etc parameters based on pure tailings material or do they incorporate co-disposal conditions? Sensitivity analysis needs to be performed and the results presented to allow the reader to determine the impact of changes to each input parameter on the model output (Sensitivity: % change in output ÷ % change in input). In addition uncertainty analysis for the parameters for which data is limited or variable needs to be performed and the results presented.	
		References: The following are mentioned in the text but are not in the reference list: Lindsay (2009), Condon (2011),Vos (1990), Williamson and Rimstidt (1994)	

References:

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

December 9, 2011

Sarah Samuelson
Tongass Minerals Group
Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

Re: Greens Creek Mine Tailings Expansion Preliminary Draft Environmental Impact Statement (PDEIS). EPA Project Number: 01-012-AFS

The U.S. Environmental Protection Agency (EPA) has reviewed the PDEIS for Hecla Greens Creek Mine's (HGCM) proposed tailings disposal facility expansion of the Greens Creek (GC) Mine in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. The EPA provided specific comments to the U.S. Forest Service on November 29, 2011. The EPA is now following up with this letter to identify our major concerns so that the Forest Service can work to address them, along with the more specific comments, in the EIS. As we have discussed in the past, if these issues are not resolved and the EPA identifies unsatisfactory environmental risks, the EPA will rate the EIS adversely. Moreover, pursuant to the Clean Water Act (CWA) and 40 CFR §1504 and the EPA's Policy and Procedures,[1] the EPA has the authority to refer an EIS to the Council of Environmental Quality when significant environmental issues cannot be resolved at the agency level. It is our desire to resolve major concerns as soon as possible before the draft EIS is published.

On November 14, 2011, the EPA signed a Memorandum of Understanding to be a cooperating agency for the GC EIS. The EPA has a strong interest in the project outcome largely due to the potential for long-term water quality management at the Greens Creek Mine. The Greens Creek Mine is an active underground metals mine located near Hawk Inlet on northern Admiralty Island on the Tongass National Forest. Full scale development began in 1987 and because of the mine's continued identification of ore reserves and the need for additional capacity for waste rock and tailings, the Forest Service has conducted multiple NEPA analyses. The last NEPA evaluation was almost a decade ago with the Forest Service's issuance of a final EIS in 2003. The current EIS evaluates the proposal to expand the tailings facility to accommodate an additional 30 to 50 years worth of tailings and waste rock disposal based on known and projected reserves. As described below, the EPA has major concerns with the PDEIS as presently drafted.

Based on our review, the EPA believes that the following critical areas need to be addressed:

- The PDEIS covers a 50-year period; however, there is no planning for adaptive management to deal with the significant unknowns and uncertainties of the future years.

[1] USEPA. 1984. Policy and Procedures for the Review of Federal Actions Impacting the Environment. Chapter 9.

- The geochemical data presented in the PDEIS is sometimes decades old, not representative, and lacking sensitivity and uncertainty analyses.
- The PDEIS does not adequately address the likely need for long-term water treatment at the site even though the need for treatment in perpetuity has been documented based on current conditions and modeling results.
- The analysis contains confusing information on waste rock management, groundwater impacts, and surface water quality; there needs to be analysis and disclosure of potential long term impacts to surface water and groundwater based on monitoring results.
- The PDEIS fails to provide the public with information on financial assurance for long-term water management.
- The PDEIS does not include a justification for eliminating an alternative from further analysis (per 40 CFR §1502.14) that would avoid wetlands associated with Tributary Creek.

The preparation and review of this EIS is important, as agencies and the public will not have another opportunity to provide input for decision making on this mine's plan for fifty years. Therefore, it is essential to disclose in detail site characteristics, mine plan activities, and analytical uncertainties. Although it may be appropriate to reference the 2003 EIS in some instances, the major issues such water resources, reclamation and long term water management should be described in detail in the current EIS. The site exists within ecologically and culturally significant areas-the National Monument and in close proximity to the Kootnoowoo wilderness area. The mine is likely to experience acid rock drainage from mine processes that will require post closure management for many years. To protect these valuable public resources, agencies must be diligent and regularly review and update monitoring protocols, mitigation measures, and adaptively respond to unforeseen circumstances.

Adaptive Management Plan

The time frame considered in this proposal poses challenges in addressing future site conditions. For example, the degree of a 20-year uncertainty for the life of the proposal, the inability to develop a final reclamation plan because of the lack of known volumes of tailings and waste rock, and unknown environmental and potential shifts in climate conditions in 50 years complicate the ability to ensure current management actions will continue to be appropriate in the future. Given these challenges and the time frame considered, the EIS should include an adaptive management plan that clearly describes the responsibilities and authorities to modify monitoring, mitigation, or adjust management activities as needed to protect natural resources. An adaptive management plan provides a basis to respond to unforeseen circumstances and should include potential contingency measures as well as triggers that would initiate a response.

The EIS should describe monitoring and mitigation commitments that the Forest Service and agencies will require throughout the life of mine to ensure that the site will be properly managed. Although the EPA appreciates the inclusion of Table 2.6-2, which lists current monitoring and authorizing entity, in some cases the entity is the mine proponent. Therefore, it is unclear if there would be any oversight or agency participation in reviews. The EIS should clarify how monitoring protocols and results undergo quality assurance checks and if there is any agency oversight. One of the table's columns is titled, "Authority/Likelihood of Implementation," however; a narrative or measure of the likelihood of implementation is not included as the column suggests. We support including a measure of monitoring/mitigation success. It may be useful to include timing and success of implementation to

identify any gaps that need to be addressed. In addition to this table, a detailed monitoring plan and mitigation plan should be included or available as an appendix. Agencies should also confirm that monitoring results are well documented and accessible for review.

Geochemistry

Acid rock drainage and metal leaching can impact water quality and require the need for long term water treatment facilities. Predicting acid rock drainage and metal leaching relies on model predictions that are based on the determination of the geochemistry of the mine materials. As such, an accurate understanding of the material geochemistry is critical for understanding the potential for long term water quality impacts and the need for mitigation measures. The Greens Creek mine has been operating since 1987. Therefore, there should be decades of monitoring results that can be used in model calibration and demonstrating water quality trends over time. However, the data presented in the EIS is confusing and not clearly linked to data collected over time. Because of the lack of clarity, we have identified gaps in the analysis regarding utilizing more current monitoring results, temporal and spatial representativeness, and disclosure of model limitations and uncertainties further discussed below.

The assessment of acid rock drainage and metal leaching needs to be a continuous process—where monitoring data is used to assess the model predictions to allow improvements over time. The modeling described in HGMC's 2011 report[2] incorporates recent observations to help guide the model; however much of the data presented in the Geochemistry section (3.4) relies on data that are one to two decades old (e.g. Figure 3.4-1; the sulphate release predictions on page 3-25, line 14). As mentioned in HGMC's report and in the referenced Lindsay et al study[3], the more recent acid-base accounting and aqueous geochemistry data should be presented in the EIS and contextualized with the earlier measurements.

It is imperative that the data used for modeling/predictions be spatially and temporally representative of current and future conditions; however, this information is not presented in the EIS. As such, it is impossible for the reader to assess the robustness of the data being presented. Furthermore, the data in the Tables and Figures within the Geochemistry section do not include any information on the number of samples collected or a measure of dispersion around the mean making it impossible to identify dataset variability.

Sensitivity and uncertainty analyses are standard procedures for environmental modeling exercises because they identify areas were additional sampling is necessary and provide confidence intervals by which to understand the range of possible outcomes. As this analysis was not included in the modeling discussion, the results cannot be sufficiently evaluated. The EIS should disclose information on the limitations and uncertainties of predicted impacts.

Long Term Water Quality and Financial Assurance

Long term Water Treatment (LTWT)

The potential need for LTWT in perpetuity in order to meet Alaska State water quality standards (WQS) has been documented based on current geochemical conditions and modeling results. The Alaska

[2] Petros GeoConsulting Inc. 2011. Greens Creek Mine Stage III Tailings Expansion Drainage Geochemistry Assessment.

[3] Lindsay, M.B.J., Condon, P.D., Jambor, J.L., Lear, K.G., Blowes, D.W., Ptacek, C.J. 2009. Mineralogical, geochemical, and microbial investigation of a sulfide-rich tailings deposit characterized by neutral drainage. Applied Geochemistry, 24 (12), pp. 2212-2221.

Department of Environmental Conservation (ADEC) also released an environmental audit in 2009[4] that identified the need for LTWT as the greatest uncertainty in the reclamation plan and cost estimate. Although this need is well known and has been discussed multiple times in agency meetings, the document is not forthcoming or consistent on this significant issue. The concern for long term water quality and need for long term treatment is not identified under the section on significant issues. Instead it states that one of the water quality concerns is "the need to 'investigate' the long term 'stability' of the tailings in compliance with Alaska water quality standards." First, the term 'stability' typically refers to geotechnical stability at mine sites and thus confuses the fact that it relates to water quality. Second, we do not feel that this captures the degree of significance of this issue and rather suggests that additional research needs to occur. We acknowledge that continuous monitoring over time will either support or disprove the predicted scenarios. However, based on current site conditions and modeling results, it is very likely that LTWT will be required. Therefore, the document should consistently clarify this as a significant issue. The EIS should also include a section disclosing the plan for long term water treatment/management.

Financial Assurance

NEPA provides for the disclosure to the public and decision-makers all information concerning environmental consequences of a proposed action before the decisions are made and before actions are taken. NEPA does not directly refer to disclosure of financial assurances. However, a key component to determining the environmental impacts of a mine is the effectiveness of closure and reclamation activities, including long-term water treatment. The amount and viability of financial assurance are critical factors in determining the effectiveness of closure and reclamation activities and, therefore, the significance of the environmental impacts.

The GC mine has not established a long term trust agreement for LTWT even with the well known need for LTWT as discussed above. Again, this is a significant issue that the EPA and others have identified as a significant gap in mitigation at the GC mine. The PDEIS included the need to reevaluate the closure bond as an item under other issues to consider in the evaluation. The bullet item refers to bonding to protect Monument values and monitoring, yet does not identify the need to establish a long term trust for LTWT. The EIS does not clearly articulate this major issue.

The EPA requested information on bond estimates for the current 30-50 year proposal in order to conduct a complete review of environmental risks. We appreciate the inclusion of Appendix A, Financial Assurance Procedures, which describes the process for bonding and discloses the current bond amount (approximately $30.5 million). The document does not, however, include a detailed cost estimate nor does it state a commitment to establish a long term trust for LTWT.

Securing an appropriate amount for reclamation and post closure activities depends on the security of the bonding mechanism and typically includes funds deposited to an interest bearing account for long term management. Funds need to be established up front to ensure that adequate bonding exists in the event that the company is unable to implement contingency measures or perform long-term operation and maintenance at a closed mine site. The EIS and this section should include a commitment to bond for LTWT and include a cost estimate, which the company should have in order to determine feasibility for future operations, and instruments that will be accepted by the Forest Service and State. This

[4] ADEC. 2009. Environmental Audit of the Greens Creek Mine Final Report.

information is critical to inform the public and decision-makers of the financial risk posed by conditions at the site. Furthermore, the document states that changes to the Plan of Operations (POO) cannot be implemented until changes in the bond are submitted. We support this procedure and recommend that activities, if approved, will not occur until the bond is current and a trust agreement is established for LTWT.

Surface Water Quality

One of EPA's primary concerns is the protection of water quality. The health of the watershed is imperative for species in the project area. Clearly understanding the current conditions and environmental consequences of water resources is critical for decision making. The section on surface water in the PDEIS is difficult to follow and does not include an analysis of surface waters in the project area. Section 303(d) of the Clean Water Act (CWA) requires identification of those waterbodies which are not meeting or not likely to meet State water quality standards. The PDEIS does not clearly disclose whether or not there are impaired waters in the project area. This information needs to be included in the document.

The discussion on baseline conditions of surface water at the site states the water quality generally meets Alaska WQS. In a following paragraph the PDEIS states that water quality in Further Creek, Further Seep, and Duck Blind Drain is of lower quality than that of Greens Creek, Tributary Creek, and Cannery Creek. It continues to state, that in general these drainages have elevated sulfate, lower pH, and elevated zinc, as well as some other metals. This section does not appear to provide a technical basis for the water quality analysis. The analysis should include numerical values and graphs depicting actual and predicted trends over time. The PDEIS provides Table 3.5-3, Summary of Surface Water Quality Monitoring Stations. However, it is very difficult to follow with over 400 cells and it is not clear which if any are exceedances. There is also no discussion of whether or not measures have been implemented in response to elevated contaminants of concern to protect beneficial uses. We recommend that a table be included that clearly identifies exceedances and near exceedances of WQS. We also believe that if actions have not been taken to resolve water quality impacts in the project area, that restorative measures must be developed and implemented.

The environmental consequences section focuses on the impact to Tributary Creek from flow diversions, which we agree is important. However, there is no analysis of specific streams or seeps in the environmental consequences section to follow up from issues identified in the baseline section or based on alternatives analysis. The majority of the environmental consequences appear to defer to the ADEC permit. Although this may be appropriate when discussing collected and treated waters, this does not address on-site impacts that appear to be occurring or may result from additional construction. The EIS should include a detailed discussion by surface water of current conditions, impaired waters with numerical values, water quality issues linked to site activities and corrective measure, environmental impacts to each stream with numerical values, and mitigation to offset impacts.

Ground Water Quality

The section on groundwater appears to have information gaps and is difficult to follow. The PDEIS identified water quality impacts caused by water seeping into groundwater or fugitive dust contaminating near surface groundwater and changes in ground water flow that contribute to area surface water as areas of concern. It is unclear how significant these concerns are and if they would remain as issues in the future. The EIS does not coherently discuss current groundwater management

and what changes would occur under this proposal. It also is not clear what current groundwater issues exist and what groundwater issues would continue to persist. The proposal includes the design to capture, treat and discharge intercepted groundwater. We are unclear if this is part of the current plan. The PDEIS refers to information gathered in 2006 that revealed elevated sulfate concentrations. It is unclear if these elevated concentrations are expected to continue with the placement of a liner. Furthermore, it also unclear if fugitive dust deposition and transport to groundwater would continue. The PDEIS states that BMPs should be employed to minimize dust from the tailings stack. BMPs should be required to protect groundwater sources from contamination.

Groundwater quality monitoring was identified as one of the resource areas for monitoring (Table 2.6-2). However, under the column "Authority/Likelihood of Implementation" it does not list an authorizing agency or whether or not it has been implemented, but references "Previous NEPA documents." It is not clear what is meant by this. The EIS should identify the authority that requires groundwater quality monitoring and the agencies that will review results and ensure that mitigation requirements are implemented.

The PDEIS discusses active management to capture and collect groundwater through control structures necessary to protect the groundwater. The PDEIS does not state whether or not this would be a component of long term water management at the site. In order to protect groundwater quality in the future, it seems that management would need to continue. The EIS should explicitly disclose whether or not long term management of groundwater resources would be required at the site. If it is, the cost of this should also be factored into a long term trust.

Waste Rock Management

The PDEIS does not clearly describe the current management of waste rock or changes that would occur. The PDEIS states that waste rock hauled to the surface is permitted to be permanently placed at Site 23. However, it also discusses the co-disposal of waste rock at the tailings disposal facility (TDF) to improve the performance of the TDF. It was our understanding that waste rock was going to be co-disposed rather than placed at Site 23. We are unclear if material would be placed at Site 23 under this proposal and how much would be co-disposed. Furthermore, it is our understanding that Site 23 may be geotechnically unstable due to the fact that it was inadvertently constructed on mass wasting material. We understand from previous discussions that the stability of this is being tested and is showing minimal shifts over time. However, this is not fully discussed in the EIS. The EIS should discuss in more detail what the current management is, when co-disposal would begin, and volumes of material that would be placed at each site. The EIS should also discuss any issues and studies involving the stability at Site 23.

Clean Water Act Section 404

The GC EIS will also serve as the NEPA process for the Corps of Engineers, Clean Water Act, Section 404 permit. As such, the alternatives analysis must satisfy the Section 404(b)(1) Guidelines. The Guidelines require that waters of the United States be avoided to the maximum extent practicable and that the least environmentally damaging practicable alternative be selected for permitting. As noted in the GC PDEIS an alternative was discussed to expand the tailings disposal facility to the northeast and southwest. This alternative would have avoided wetlands associated with Tributary Creek. The GC PDEIS eliminated this alternative from further consideration with little explanation of why it was not practicable. If indeed this alternative is not practicable a full explanation justifying elimination from

consideration needs to be included in the document. Otherwise it should be carried forward in the alternative analysis.

Thank you for the opportunity to participate early in the review process. We look forward to further discussing our comments and working through any issues at our upcoming cooperating agency meeting. If you any have questions or comments in the interim, please contact me at (206) 553-1601 or by electronic mail at reichgott.christine@epa.gov, or you may contact Lynne McWhorter of my staff at (206) 553-0205 or by electronic mail at mcwhorter.lynne@epa.gov.

Sincerely,

//s//

Christine B. Reichgott, Unit Manager
Environmental Review and Sediment Management Unit

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

OFFICE OF THE
REGIONAL ADMINISTRATOR

July 24, 2012

Forrest Cole, Forest Supervisor
Tongass National Forest
648 Mission Street
Federal Building
Ketchikan, Alaska 99901-6591

Dear Mr. Cole:

The U.S. Environmental Protection Agency has reviewed the Greens Creek Mine Tailings Expansion Draft Environmental Impact Statement. Our review and comments are provided in accordance with our responsibilities under the National Environmental Policy Act (NEPA), the Council of Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500-1508, and our review authority under Section 309 of the Clean Air Act. For the reasons described below, the EPA is rating the Greens Creek Mine Tailings Expansion Draft Environmental Impact Statement (DEIS) "3-Inadequate Information." An explanation of our rating system is enclosed. The EPA would like to discuss these comments with you so that we can develop a path forward that both allows for a more fully-developed, sufficient EIS and ensures a mine plan that will provide adequate protection of public resources. We recommend that this information be provided as a supplement to the draft EIS and circulated for public comment.

Background
On November 14, 2011, the EPA signed a Memorandum of Understanding with the U.S. Forest Service to be a cooperating agency for the Greens Creek Mine Tailings Expansion EIS. The EPA has a particular interest in the water quality issues, especially the need for long-term water quality treatment at the Greens Creek Mine.

The Greens Creek Mine is an active underground metals mine located near Hawk Inlet on northern Admiralty Island on the Tongass National Forest. In addition, portions of the mine facilities are within the Admiralty Island National Monument. Full scale development began in 1987 and because of the operator's continued identification of ore reserves and the need for additional capacity for waste rock and tailings, the Forest Service conducted previous NEPA analyses in 1984, 1988 and 2003. The current EIS evaluates the proposal to expand the tailings facility to accommodate disposal of additional tailings and waste rock based on known and projected reserves for the next thirty to fifty years.

The DEIS analyzes a Proposed Action (Alternative B) to allow up to fifty years of additional capacity for tailings disposal. The proposal includes expanding the existing tailings facility and would result in a loss of 4,046 feet of Tributary Creek (Class I and Class II stream) and 99 acres of jurisdictional wetlands. It would also directly impact an additional 109 acres of the Admiralty Island National Monument. The proposed action's reclamation plan includes an engineered soil cover and synthetic liner system as part of the water management system. The two other alternatives, Alternatives C and D, would minimize impacts to Tributary Creek and the Monument by constructing an additional tailings

facility north of the current facility. This new facility would impact 1,044 feet of Fowler Creek (Class I and Class II) and result in a loss of 114 or 124 acres of wetlands respectively. Under the proposed action and all alternatives, the DEIS identifies the need for water quality treatment in perpetuity.

The EPA provided comments to the Forest Service on the preliminary DEIS on December 9, 2011. We are pleased to note that the DEIS addresses a number of our concerns, clarifying the need for and commitment to long term water treatment and adaptive management. However, the EPA still believes that there is inadequate information regarding financial assurance and environmental analysis. The EPA also has concerns regarding long term environmental impacts to wetlands and Monument values.

Financial Assurance and Environmental Analysis

The EPA commends the Forest Service for acknowledging the need for long term water treatment. We appreciate the information about the process for establishing financial assurance provided in Appendix B, and subsequent discussions about developing financial assurance for long term water quality treatment at Greens Creek Mine that may hold promise. However, funding for long term water management/treatment is not addressed in the DEIS. Therefore, without this information the EPA cannot determine whether water management and source control will be adequate to protect beneficial uses and habitat. Beneficial uses are established for waters within the Greens Creek project area. The most stringent parameters and metals criteria are for the protection of fish propagation and aquatic life. The DEIS states that water quality criteria would be exceeded for both freshwater and marine waters for multiple parameters without active collection and treatment. The DEIS includes a table showing monitoring data for 22 surface water locations over 10 years and lists exceedances of contaminants of concern for each monitoring site. This demonstrates that improved material handling and source control are required and that the current National Pollutants Discharge Elimination System (NPDES) permits for the facility may need additional conditions to protect water quality.

We believe that the full range of potential impacts to aquatic resources should be analyzed in the context of mitigation uncertainty. In addition, we also believe that the modeling predictions used in the analysis are limited and lack sufficient detail to support long term planning. Without knowledge of the model and assumptions, reviewers and the decision maker cannot understand the environmental risks, ensure that adequate mitigation is required, and support selecting an alternative that meets the purpose and need while minimizing impacts.

Recommendations:

- *Provide sufficient detail on the cost of proposed reclamation and long term water treatment. (Please see the attached detailed comments for a list of items that the EPA believes are components of adequate financial assurance).*
- *Include an analysis of environmental impacts to aquatic resources from reasonably foreseeable scenarios.*
- *Provide information on the quality of the geochemical modeling—specifically disclosing the impacts of limited and unknown information on the model predictions and the sensitivity of the model to changes in parameters and assumptions.*

The following discussion is provided to further clarify our concerns regarding financial assurance, analyses of long term impacts, and geochemical modeling.

Financial Assurance

In our review of the 2003 EIS for this project and throughout the development of this DEIS, the EPA has stressed the importance of establishing and disclosing the details of financial assurance for reclamation and long term water management. We believe the Forest Service and State of Alaska agree that financial assurance is important and needed. For example, the State identified the lack of long term bonding as the greatest uncertainty for the mine[1]. However, inadequate financial assurance persists at the Greens Creek Mine. While the DEIS states that financial assurance will be established, the DEIS limits the discussion to the Forest Service and State's process to establish financial assurance and information about the current bond amount of $30,455,000 which does not include long term water treatment.

The EPA appreciates the inclusion of Appendices B and F that outline the process for establishing financial assurance and current bond information. However, the DEIS does not provide an adequate level of detail about the mechanism and cost for long term bonding or proposed reclamation. This information is needed to provide assurance that significant environmental impacts will be avoided or mitigated and that mitigation measures, operation and maintenance, and closure/post closure activities will be adequately bonded if the company fails to meet its requirements. Adequate financial assurance should be required for reclamation and potential long term maintenance of the cover system and long term water management. In order to resolve these issues regarding inadequate information, the EPA recommends that the Forest Service develop and disclose details regarding long term bonding and reclamation of proposed activities as a supplement to the draft EIS, and circulate it for public comment.

Analyses of Long Term Impacts

Without details in the EIS of adequate financial assurance to ensure that mitigation and regulatory requirements will be met to protect resources over the long term, we believe the impact analysis for aquatic resources is inadequate. The EIS needs to analyze the potential of the project to adversely impact beneficial uses of aquatic life and fish propagation and the potential to cause or contribute to water quality standards violations. Watersheds within the Greens Creek project area support anadromous and resident fish, and Hawk Inlet (site of the NPDES discharge point) supports a high value fishery. Through our conversations with the Forest Service, we understand that the assumption underlying the analyses in the DEIS is that there will be full compliance with the mine's NPDES permit in perpetuity. As noted above, there may be a need for more protective conditions in the current NPDES permit to prevent continued and additional water quality impacts. However, the DEIS does not analyze the potential environmental impacts if active water treatment ceases. We acknowledge that full compliance with an appropriately protective permit is a best case scenario; however, we believe that it is not reasonable or realistic to rely solely on this assumption given that the DEIS does not disclose adequate financial assurance to fund mitigation and water management. We note that it is not uncommon for mines to experience unforeseen circumstances as demonstrated at Greens Creek Mine where acid generating material resulted in greater than expected elevated metal concentrations in surface and ground water. Mines may undergo unexpected closures due to factors such as fluctuating metals prices and safety (e.g., Greens Creek closure between 1993 and 1996 due to low metal prices and Hecla's Lucky Friday mine in

[1] ADEC. 2009. *Environmental Audit of the Greens Creek Mine.*

Idaho in 2011 due to safety concerns). The USFS should evaluate reasonable scenarios in order to disclose the potential impacts and to design appropriate alternatives and mitigation. Given that permanent wastewater treatment does not appear to be funded under the current bond for the mine, changes to waste management that would prevent wastewater treatment in the future appear to be the only viable mechanisms to protect water quality.

Geochemical Modeling

The USFS should disclose the probability that predictions are accurate and identify any uncertainties or gaps. The level of confidence in predicted outcomes should be provided so that reasonable decisions about management, monitoring, and mitigation will be made.

Disclosure of the uncertainty and sensitivity analysis is a key component in interpreting predictions. We recommend considering the EPA's guidance[2] (previously provided) as a resource on sufficient level of detail when discussing environmental modeling.

Long Term Impacts to Wetlands

The Greens Creek EIS will be adopted by the Corps of Engineers for their decision to issue a Clean Water Act Section 404 permit. As such, the alternatives analysis must satisfy the Section 404(b) (1) Guidelines. The Guidelines require that waters of the United States be avoided to the maximum extent practicable and that the least environmentally damaging practicable alternative be selected for permitting. The Corps of Engineers released a Public Notice of Application on April 20, 2012, for the discharge of fill material into waters of the United States to facilitate the construction of a dry stack mine tailings disposal site in a southward direction to create a maximum capacity for 15 million cubic yards of additional tailings and waste rock materials.

All alternatives discussed in the DEIS and Public Notice would fill high value wetlands and impact salmon bearing streams. The Proposed Action, Alternative B, would fill portions of Tributary Creek, which would affect stream habitat and Alternatives C and D would fill wetlands that drain into Fowler Creek.

Concurrent, coordinated NEPA processes are encouraged to save time and money. CEQ recommends that to the fullest extent possible, agencies prepare draft EISs concurrently with and integrated with environmental analyses required by other environmental laws and executive orders[3]. We note that this DEIS includes information that the EPA and the Corps of Engineers requested on the functions and values of aquatic resources, but does not include other information relevant to the analysis of wetland impacts and mitigation.

> *The EPA recommends that the 404(b)(1) analysis be completed before publication of the final EIS, giving agencies an opportunity to take a hard look at minimizing long term impacts to wetlands.*

[2] USEPA. 2009. Guidance on the Development, Evaluation, and Applications of Environmental Models. https://ecf.oknd.uscourts.gov/cgi-bin/DisplayPDF.pl?dm_id=852412&dm_seq=17

[3] 40 CFR Sections 1502.25. http://ceq.hss.doe.gov/nepa/regs/ceq/1502 htm

The EPA is committed to continuing our discussions with you to identify mechanisms to resolve the issues indentified in these comments. Thank you for the opportunity to provide comments on this DEIS. Our detailed comments are attached.

Please contact Kate Kelly, Director of the Office of Ecosystems, Tribal and Public Affairs at 206-553-1271 or Christine Reichgott, Manager of the Environmental Review and Sediment Management Unit at 206-553-1601 if you have questions.

Sincerely,

//s//

Dennis J. McLerran,
Regional Administrator

cc: US Army Corps of Engineers
Alaska Department of Natural Resources
Alaska Department of Environmental Conservation

Enclosures

EPA's Detailed Comments on Greens Creek Mine DEIS

Financial Assurance

Hardrock mines without appropriate financial assurance can pose significant risks to human health and the environment, and financial risks to responsible parties and the government should clean up become necessary[4]. Appropriate financial assurance ensures that adequate funds will be available to reclaim mines and conduct post-closure management according to approved plans, and thus avoid serious environmental impacts. If information on financial assurance is not disclosed in a NEPA document, decision makers, the EPA, other agencies, and the public are unable to evaluate the potential environmental consequences of proposed mine activities on public lands in a public forum. Because the adequacy of financial assurance is critical to determining the probability of mitigation measure implementation, the estimated amount and adequacy of the financial assurance should be discussed in the EIS transparently and prospectively.

The EPA understands that the Forest Service is currently working with the State to update current reclamation costs and financial assurance at the Greens Creek Mine, as part of the State's five year review cycle. This evaluation includes activities covered in the 2003 EIS but does not include the current, proposed activities. We recommend that the Forest Service consider including the proposed activities and financial information for long term site management in an updated financial assurance package. We note that Appendix B of the DEIS states that financial assurance for proposed actions will need to be developed prior to approving the Plan of Operations. Including the current activities and financial information in the financial assurance update could expedite the approval process.

Our specific comments and recommendations for developing the financial assurance for reclamation and long term water management are provided below.

Review of Appendix B

The Forest Service and State's process is described in Appendix B, which states that the cost estimate and financial assurance will not be finalized until after the modification is approved by the Forest Service. We continue to believe that information about the cost estimate and bonding should be made available during the NEPA process.

Appendix B states that bonding will occur incrementally, in periods not to exceed 10 years. Since water quality treatment will be required at this site in perpetuity, operation and maintenance (O&M) costs will be necessary for potentially hundreds of years. Financial assurance is meant to ensure that there will be funds to complete required reclamation tasks, (as Appendix B states, to serve as "the public's insurance policy that reclamation will be performed,"). We believe there is risk to the federal government if the

[4] For example, EPA chose classes of facilities within the hardrock mining industry as the first for which EPA would develop financial responsibility requirements under CERCLA Section 108(b), based upon those facilities' sheer size; the enormous quantities of waste and other materials exposed to the environment; the wide range of hazardous substances released to the environment; the number of active hardrock mining facilities; the extent of environmental contamination; the number of sites in the CERCLA site inventory, government expenditures, projected clean-up costs and corporate structure and bankruptcy potential. Identification of Priority Classes of Facilities for Development of CERCLA Section 108(b) Financial Responsibility Requirements, 74 Fed. Reg. 37,213 (July 28, 2009).

bond only covers a fraction of that time period. If only 10 years is bonded at a time, and Hecla Mining Company is unable to perform reclamation, the taxpayers may incur this liability.

Appendix B states that the bond review cycle will be 5 years. However, Forest Service guidelines recommend that bonds be reviewed annually for adequacy. Given the volatility of the minerals market, annually ensuring that the financial assurance amount is at least equal to the current cost estimate may prevent a situation where a drop in commodities prices leaves the company in poor financial health and unable to update the instrument. Annual adjustments ensure that the financial assurance amount is close to the cost estimate amount in any given year.

Review of Current Bond

We appreciate the information that the Forest Service shared regarding the current bond for $30,455,000. Our assessment is based on what is disclosed in the EIS. To ensure that the overall financial assurance is protective at Greens Creek Mine, the USFS should provide the following additional information:

Site Reclamation (e.g., facility closure, earth moving/stabilization, revegetation, etc.):

- Estimated cost (+/- percent) to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives.
- Criteria for determining success of reclamation activities for bond release.
- Costs associated with implementing contingency measures to address reasonably foreseeable but not specifically predicted outcomes.

Long-Term Site Management (e.g., post-closure water treatment, mitigation of aquatic resources, site maintenance, and monitoring):

- Itemized cost estimate (including reasonable contingencies) and appropriate economic variables to calculate the net present value of future expenses, including the time period to complete long term treatment, monitoring and maintenance.
- The "mechanics" of the financial assurance mechanism for the site, for example, if a trust is being used, include such details as:
    - Requirements for timing of payments into the trust fund and for "true-ups";
    - Discount rate used, if any, including assumptions for inflation, management fees, and tax rates;
    - Acceptable investment instruments;
    - Tax status of the trust fund and how management fees and taxes are paid; and
    - Identification of the trust fund beneficiaries.

Aquatic Resources

The DEIS states that metals concentrations in fish tissue have been observed in area streams. For example, in Tributary Creek and Greens Creek fish tissue samples have shown an accumulation of metals including cadmium, copper and selenium, a bioaccumulating metalloid. The DEIS does not clearly present the basis for this summarized conclusion. The discussion of baseline conditions related to mine activities should include a method to identify the source(s) of contaminants and measures to control source(s). The USFS should consider the suite of mitigation measures and the potential impacts to aquatic resources from current and proposed activities.

The DEIS includes Table 2.6-3 listing monitoring requirements and thresholds which would trigger an action. For aquatic resources, the threshold is a significant change as compared to baseline or reference site. The follow up action is to increase the number of parameters analyzed in water samples. We believe that there should also be corrective action required to identify the source(s) causing an impact and intent to control that source or sources.

Wetlands

The DEIS proposes mitigation in the form of repairing a fish pass on Greens Creek, which is considered a temporary mitigation. Flood damage caused the constructed fish pass, used as mitigation previously, to fail and it has not been repaired. Because it is not part of the natural geomorphic form of the stream, the fish pass is not self sustainable and requires maintenance. After mine closure if maintenance ceases and the next flood damage at the fish pass is not repaired, fish will again be eliminated from that stretch of stream. Although the EPA would not typically consider actions that are not self sustaining to be adequate mitigation, if this is determined to meet mitigation requirements, financial assurance should be included to cover the costs of ongoing maintenance.

The Corps of Engineers' Public Notice proposes in-lieu-fees to mitigate for wetland loss. The impacted wetlands are all high value and support salmon streams. A very high ratio would need to be required by the Corps to effectively offset these impacts through in-lieu-fees. The USFS should provide details of how the proposed in-lieu-fee amount and credits for aquatic resource compensation were determined so that their adequacy for mitigation can be determined. In the event that long term water management and mitigation fail, waste rock and tailings facilities sites will produce acid drainage, increasing mobility of metals, allowing them to flow to Hawk Inlet and the respective salmon stream, Tributary Creek and/or Fowler Creek. We believe it is crucial that engineered structures constructed to direct flow in a particular direction function without active maintenance. During the analysis to determine the least environmentally damaging practicable alternative, additional design may be needed to further minimize the risk to surface waters. For example it may be possible to concentrate the placement of additional tailings to minimize impacts. We will be providing comments to the Corps of Engineers per the EPA's shared responsibility to administer and enforce CWA Section 404.

The DEIS states that increased flow to the stream channels may be capable of scouring sediment and impacting the dynamic equilibrium of stream channel morphology. In such a case, habitat values are likely to be lost for an extended distance downstream. If the stream is entrenched as a result, then riverine wetlands would be hydrologically disconnected from the stream, degrading their functional role with the stream (flood water and sediment storage and nutrient export). Erosion of the channel would likely cause sediment deposition in estuarine waters of the delta and marine waters at either Hawk Inlet or Youngs Bay. The DEIS states that monitoring will be required to detect this effect and implement remedial measures. However, once the erosive process starts, damage to stream quality will have occurred. Construction of storm water ponds, proposed as remedial measures, will take time, allowing damage to progress. Once stream morphologic equilibrium has been upset it will likely be reestablished in a different geomorphic and ecological state, responding to the new post erosion conditions. Quality in stream habitat may take a very long time to become reestablished. Therefore, we recommend that the USFS consider the construction of stormwater detention structures along with the facility rather than post monitoring. If this results in additional wetland impacts, these impacts should be disclosed and mitigated.

Geochemistry
We have several issues regarding different aspects of the geochemical characterization of the site. Specifically these issues are regarding: 1) the temporal representativeness of samples collected from the tailings; 2) the accuracy of the predictive modeling of the tailings water quality; and 3) the visualization of acid-base accounting data.

Sample temporal representativeness The DEIS offers inadequate justification/citation to support the statement that the tailings data shown in Table 3.4-1 represents a ~5 year range of materials (i.e. mid-to-late 1990s). During previous discussions with the agency's EIS technical team the temporal representativeness of this same data has been said to represent an approximately 24 year time frame (i.e. 1988 to present). The large range of estimates of the temporal representativeness of the data (and lack of citation/justification) makes interpretation difficult.

The DEIS presents data from single samples that were "randomly" collected; however it is unclear whether these samples were truly randomly selected or whether these are grab samples collected for another specific study, and therefore not representative of the average conditions of the tailings. It is important that the data is representative of the average conditions of the tailings. The DEIS should rely on summary statistics (e.g. averages, medians) that also include measures of variability (e.g., standard deviations/errors, ranges, etc.) to provide an overall and unbiased understanding of the data that has been collected.

Tailings water quality modeling Overall, there are three main reasons why we believe the modeling performed as part of this DEIS is inadequate: 1) The model has not been subject to the peer-review process and is not publically available or available to the EPA—a cooperating agency on this project; 2) the model was not developed for the purposes of predicting long-term water quality. From Condon, 2011 *"[The model] is intended to be used as a tool to provide a reasonable indication of the characteristics of drainage under anticipated conditions, particularly following closure of the facility. It is not intended to predict exactly the concentration of trace elements or metals hundreds to thousands of years in the future"*; and 3) a sensitivity and uncertainty analysis was not performed on the model.

To support the validity of the geochemical modeling, the DEIS cites similarities between the 2003 final EIS and the current Condon, 2011 modeling results. For example: *The agreement between model results generated on a theoretical basis (2003) and an empirical, field data basis serves to reinforce confidence in the estimates produced by Condon (2011)* (p3-33). However, this is not an entirely accurate description of the 2003 model. For example, from the 2003 EIS it states that: *The model is semi-empirical, meaning that portions of the model mechanistically simulate physical and chemical processes based on basic principles, and other parts of the model rely on empirical measurements…*" Furthermore, the 2003 model was calibrated using empirical wet well data from the tailings. As such, the two models are not entirely independent and the agreement between them should not be used to imply greater confidence than is warranted.

EPA Specific Comments on Greens Creek DEIS

Document Page Number	Line Number	Comment
1-7 and 2-6		On page 1-7 the DEIS states that the tailings disposal facility (TDF) would accommodate an additional 15 million cubic yards of tailings and waste rock. On page 2-6 the DEIS states that the proposed action includes expanding the TDF to a total of 15 million cubic yards. Please correct these discrepancies.
1-14	10	The wording should be to add Chapter 83 to Title 18 not "Title 83"
2-1	¶2	2nd to the last line – "resources" should be "resource"
2-8	3	This part states that there will be room for an additional 1 m yd^3 and that this room would allow for 3 more years of disposal. But Section 2.3.1 says that 180,000 yd^3/yr of tailings are disposed and 54,000 yd^3/yr are co-disposed. 1m yd^3 / (180,000 + 54,000) = 4.3 years
2-12	3	Same comment as above except it is 3 m yd^3 adding 10 more years of disposal but even adding the average waste rock going to Site 23, the math comes out to 12 yrs.
2-12	Footnote 2	Is this necessary since Footnote 1 says the same?
2-16	6	then discharged to Hawk Inlet
2-20	11	The existing mitigation measures listed further seem to apply to both water and wind so should wind be deleted here or should "surface water diversions" be deleted from line 13?
2-23	Section 2.4.8 ¶2	It is not clear how surface water diversions prevent wind erosion
2-28	Section 2.5.2	The language about submarine tailings disposal from the previous page is repeated here.
3-21	Last ¶	Please clarify how the Nevada Division of Water Resources safety factors are applicable in SE Alaska given the differential rainfall and the potentially related differential in pore water pressure conditions.
3-24	Table 3.4-1	Several issues: 1) There are extra periods in the data (e.g. 3.8.3 %); 2) Barite should be 12.0 instead of 12.3; 3) the chemical formula for chlorite the "5" should be subscripted; and 4) n=12 should be added to the Table title.
-24		The averages are based on 12 samples not 14 samples.
3-24		Waterloo (2011) is not listed in the references.
3-25		Regarding: "Data presented in the figure span ages from 1994 to 2008 and provide a representation of the variability of the acid-base balance in Greens Creek tailings." It should be clear what the dates represent—are these the dates the samples were collected or the dates the ABA analysis was completed? It's not entirely clear, but it appears that the data referred to as "2008 data" may have been collected in 2005 and stored in the freezer

		for 3 years before it was analyzed. If this is the case, the Figure and text should be changed to say 2005 data instead of "current study" or "2008".
3-25		Regarding: "The dashed box in (b) corresponds to the range of data in (a) for the years 1994-2004." This information should be placed in the Figure 3.4-1caption and not in the main body of the text.
3-27	Table 3.4-3	For Hg there is a footnote 14 that doesn't seem to refer to anything.
3-27		The statement that the grain size of the tails remains essentially constant would only be accurate if there were no co-disposal occurring, since the waste rock material in the tailings would result in the tailings having very heterogeneous grain sizes (as mentioned on p 3-25). Other statements on p 3-29 also make reference to the tailings being fine-grained and how this would restrict infiltration; however, the impacts on infiltration during co-disposal scenarios due to the large grain size of the waste rock is not discussed.
3-28		Regarding "Laboratory rate equations have also been established for oxidation of pyrite at the Greens Creek Mine site (Williamson and Rimstidt 1994)." A reasonable interpretation of this sentence implies that Williamson and Rimstidt, 1994 performed a laboratory study on Greens Creek tailings materials to determine the pyrite oxidation rates. However, the rate law presented in Williamson and Rimstidt, 1994 is not based on Greens Creek samples but instead was performed on pyrite that was obtained from Peru. Presumably, the pyrite oxidation rate of 200 mg/kg/week presented in the DEIS was calculated using the rate law established in Williamson and Rimstidt, 1994 by using Greens Creek site specific data. The way the sentence is currently worded and cited may be misleading. Suggested change "Using the general rate law for pyrite destruction established by Williamson and Rimstidt, 1994, Greens Creek site specific data was used to predict…."
3-29		Text describes the development of ARD in seeps associated with tailings "where unlimited water and oxygen were available." It is clear that a distinction is being made between those areas and the current and future TDF based on their exposure to oxygen, but it isn't clear what those areas were other than that they were "associated with tailings." Describe their locations and other characteristics and explain how their setting is different from those that will be found in the future.
3-33		Regarding: "In other words, the inherent error of the points associated with each model line overlaps every other line." The graphs do not show any measure of the error associated with the

		lines. If uncertainty and sensitivity analysis were not performed on the model how was the level of error determined?
3-33		Regarding: "Overall, the modeled estimates for future water quality discharging from the tailings impoundment is very similar to the estimates made in 2003." The term "very similar" is vague and a more quantitative statement is preferable. In doing our own comparison of the 2003 and 2011 models, for most parameters the predictions between the two are within the same order of magnitude, though 2 to 7-fold differences are common. For some elements (such as Selenium and Cadmium) the difference in the two model's predictions means the differences between meeting and exceeding Alaska Chronic Fresh WQS. As such, stating that the model results were within the same order of magnitude is more accurate than stating that they were "very similar".
3-76		"The groundwater monitoring system will be used..." Doesn't the expansion require a new ground water monitoring system? Explain when that system is designed, where it will be fully described and whether it will be available for public review.
Section 3.4.2		Clarify the locations of the seeps discussed here-- are they within the TSF, in nearby areas with drainage controlled and directed to treatment, or in uncontrolled areas?
Section 3.4.4, p 3-34	Figure 3.4	The summary should list the parameters that are expected to exceed WQS. *Acid-base accounting* We believe the geochemistry data presented in Figure 3.4- contains inaccurate and incomplete information. For example: • In graph (a) the "boxes" labeled 2002-2004 should be labeled 1994; and presumably the "triangle" data labeled 1994 should be changed to 2002-2004. • The DEIS text refers to the "circle" data as "raw data"; however on graph (a) it is referred to as "Current study" and on graph (b) it is referred to as "Reported". Using consistent terminology between graphs and the text will increase the clarity of the information presented. • Showing the raw data twice on graph (a) and (b) does not make sense as the raw data should not be used for temporal comparisons—instead the corrected/calculated values are a better comparison. If the "calculated" values were added to graph (a) instead of the "reported" values this would then negate the need to the "dashed box" in graph (b). This would result in a stronger visual representation of the data. To demonstrate that there has not been any systematic change in the acid-base ratios over time, the EIS should present all of the years' data on a single graph. As such, data that was collected

		from 1990 and 1999 (as presented in the 2003 EIS) should be added to this figure.
3-77	¶ before 3.6.3.5	"would" should be "could" (this was changed in an earlier reference (pg 76 ¶ before Mitigated B) but not here or the next one)
3-78	¶ 3	"would" should be "could" (see above)
3-93	1 – 13	Earlier in the document, there was a statement about the inlet fully flushing every 5 tidal cycles. Does this have any impact on what is presented in this section?
3-135	1st line after Table	"were" should be "are"
3-136	Tables 3.10-4,6,7,8	For each of these tables except 10-6, the numbers in the columns add up to the Total shown. Each has a note below stating that a certain amount of acreage is included but that amount is only added in to the total in Table 3.10-6. Why is it added here and not in the other Tables?
	Table 3.4.1	The percent by weight column has extra decimals. The paragraph above the table describes the number of samples and the multiple depths, but needs to clarify the number of separate locations sampled as well.
Section 3.22		The cumulative effects of activities potentially impacting water resources at the mine need to be considered. For example, we understand that waste rock storage facility, Site 23, was constructed on a historic landslide event in uplands directly above Greens Creek and has been incrementally shifting. The EIS should disclose site conditions such as this that may impact water resources in the future should be disclosed.

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

May 28, 2010

Barry Myers
Bureau of Land Management
Pocatello Field Office
4350 Cliffs Drive
Pocatello, ID 83204

Re: Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for the Proposed Dairy Syncline Mine
EPA Project Number 10-030-BLM

Dear Mr. Myers:

The U.S. Environmental Protection Agency (EPA) reviewed the NOI and BLM/USFS letter providing additional scoping details for the Proposed Dairy Syncline Phosphate Mine in SE Idaho. Our review was conducted in accordance with EPA responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA).

The NOI and letter describe a new phosphate mine proposed by J.R. Simplot located in the Caribou-Targhee National Forest. The mine would disturb approximately 2100 acres (1796 on lease and 337 acres off lease). Preliminary, general issues are identified and include potential impacts to surface and ground water quality/quantity, wildlife, grazing, Native American rights/resources, inventoried roadless areas (IRAs), and wetlands and riparian habitat. EPA agrees that these are appropriate general issues that must be evaluated in the EIS.

This proposal is located in SE Idaho, which is a large phosphate mining district in the region. There are approximately 15 other large-scale open pit phosphate mines in this district that have been mined over the past 60 years. As you are aware, EPA, BLM, USFS, IDEQ, and other agencies are working together to conduct CERCLA investigations and cleanup actions at many of these phosphate mine sites, including Simplot's Smoky Canyon Mine, Conda and Woodall Mountain Mines, Gay Mine, and Lanes Creek property. These and other mine sites have left a legacy of contamination that is responsible for widespread surface water contamination, localized but numerous groundwater impacts, impacts to fisheries, and contaminated vegetation that has resulted in significant losses of livestock (including sheep, horses, and cattle). In light of the large scope and existence of serious adverse impacts to the environment, we believe that it is imperative that this mine be designed such that it avoids environmental degradation that have occurred at other mines and does not cause or contribute to current problems and preserves public resources.

In consideration of the past environmental impacts outlined above, there are a number of issues that merit added scrutiny. These include: (1) how the project may impact the quality of groundwater and surface water; (2) impacts to reclamation vegetation and risks to wildlife and livestock; and (3) impacts to wetlands and other waters of the United States.

Our other key concerns include ensuring that a complete range of alternatives are analyzed; employing an appropriately conservative approach to environmental modeling; making sure that there is adequate financial assurance to ensure that the mine is reclaimed and managed post-closure if necessary; and taking a hard look at potential impacts to cultural resources, IRAs, and fish and wildlife. In addition, we understand that there have been discussions regarding a land exchange or sale that would transfer title to Simplot. If this approach is pursued, then the EIS should discuss the consequences of such an action, including implications for mine administration and oversight, financial assurance, and public participation. Details regarding these issues and other general recommendations are enclosed for your consideration during the development of the EIS.

I also want to thank you for talking with me about the project proposal. During our discussion regarding the project I requested that EPA be involved in review of preliminary reports and documents if possible. Because of the legacy of environmental contamination from phosphate mines in SE Idaho, we are keenly interested in ensuring that environmental resources are protected. Reviewing preliminary reports and documents allows us the opportunity to aid in identifying issues early in the process and provide feedback during the development of the EIS. We have found that it is beneficial to work through issues prior to the public draft EIS when analyses can be modified and mitigation is being designed. I appreciate your consideration on this matter and we look forward to talking with you more and exploring this possibility.

Thank you for the opportunity to provide comments early in the NEPA process. If you have any questions please contact me at (206) 553-0205 or via email at mcwhorter.lynne@epa.gov.

Sincerely,

//s//

Lynne McWhorter
Environmental Review and Sediment Management Unit

Cc: Dave Tomten, EPA R10 Idaho Operations Office

EPA Scoping Comments on Proposed
Dairy Syncline Phosphate Mine

Purpose and Need

The NEPA analysis should include a clear and concise statement of the underlying purpose and need for the proposed action, consistent with the implementing regulations for NEPA (see 40 CFR 1502.13). In presenting the purpose and need for the proposed action, the NEPA analysis should reflect not only the purpose, but also the broader public interest and need.

Range of Alternatives to Protect Water and Air Resources

EPA strongly recommends that the NEPA analysis evaluate reasonable alternatives or mitigation measures to reduce or minimize adverse impacts to groundwater and surface water that may be hydrologically connected and minimize impacts to air.

We recommend that the range of alternatives consider opportunities to reduce the footprint of disturbance, consider risks posed through each pathway, and incorporate treatment as a principal element to remove contaminants from waste streams to reduce post-closure monitoring and management obligations.

The NEPA analysis should clearly outline the physical design of current and proposed facilities (including waste dumps, disposal areas, cover system alternatives, water storage facilities), and address key questions related to water movement and water balance.

In evaluating proposed mine facilities the analysis should include an evaluation of methods for determining performance. This type of monitoring would provide an early warning system in case the proposed mine facilities or cover systems do not conform to model predictions. It is critical, however, that such monitoring be considered during initial design and be incorporated into the plans before construction.

Water Quality/Wetlands

<u>Surface water/Groundwater Quality</u>

One of our main concerns is related to water quality and potential impacts from selenium, sediment, temperature, and other contaminants of concern. We are especially concerned with transport of contaminants to groundwater and surface water from the proposed pit areas, waste rock piles, and tailings facilities. We understand that currently groundwater flow is not characterized for the site and that BLM will be developing this over the next two years. We support developing a thorough understanding of groundwater/surface water interaction and recommend that a comprehensive study plan be developed which identifies key questions of concern and methods for answering questions which should accompany the analysis.

Impaired Waterbodies

The NEPA analysis should discuss current surface water quality and natural background conditions. Section 303(d) of the Clean Water Act (CWA) requires the States to identify those waterbodies which are not meeting or not likely to meet State and Tribal water quality standards. The Blackfoot River is currently listed on IDEQs 303(d) list of impaired waters for sediment. This stream and any other impaired water bodies in the project area, along with the pollutants of concern, should be disclosed in the EIS. The NEPA analysis should discuss how a proposed project will identify which waterbodies may be impacted by the project, the nature of the potential impacts, and the specific pollutants likely to impact those waters. It should also include requirements to report those waterbodies potentially affected by the project that are listed on the State's current 303(d) list and whether Idaho Department of Environmental Quality has developed a water quality restoration plan-Total Maximum Daily Load (TMDL) for the waterbodies and the pollutants of concern. If a TMDL has not been established for those waterbodies impacted by a proposed project, on the 303(d) list, as is the case here, then in the interim until one is established, the analysis must include an evaluation of whether or the extent to which the project would achieve requirements that there will be no net degradation of water quality to the listed waters.

The analysis should evaluate impacts to surface water quality and ground water quality from the proposed operations. The proposed operations include not only traditional mining operations, but also impacts related to on and off-site transportation, shipment or ore, and disposal of tailing. The types and magnitude of impacts may vary with the project life cycle (construction, operation, temporary shutdown, closure, and post closure).

Wetlands

The NEPA analysis should include a map of surface water and wetlands in the project area. The analysis should discuss how many acres of wetlands and what type of wetlands would be impacted by the mine expansion. There should be a discussion of how Clean Water Act (CWA) Section 404 requirements for wetlands would be met if there are activities that could have potential impacts to adjacent wetlands or indirect impacts to wetlands such as hydrologic changes due to increases in impervious surface will be evaluated.

Water Balance Modeling

Mathematical modeling used for describing the physical and chemical characteristics of the site or potential impacts, including modeling used for water balance projections, should incorporate a clear statement of the management objectives intended to be achieved by the modeling, and the level of analysis required to meet the objectives; a site-specific conceptual model that describes the system boundaries, time and length scales, hydraulic and chemical characteristics, sources of data and data gaps, and the mathematical relationships used to describe processes; tables of parameter values used in the model, and tables and graphs of results; errors associated with both measured and assumed data, and with results; and recommendations for further analysis. The water balance should include a facility water balance constructed within the framework of a site water balance. Input assumptions should be

environmentally conservative and consider the full range of operating and climatic conditions.

Water Management and Treatment

The NEPA analysis should explain the current and proposed operations plans for water management and treatment. The EIS should evaluate and disclose the adequacy, reliability, and operational uncertainty associated with proposed water management techniques over the range of operating and climatic conditions. The analysis should characterize chemical compositions and quantities of process waters, mine drainage, storm water, and treated and untreated effluents. This information should be supported by the results of treatability testing. Assumptions used in the analysis should be reasonably conservative.

Characterization of Hydrologic Setting

The water balance noted above should be tied to characterization of the hydrogeologic setting through a site-wide water balance and whether and how the plans will be revised for the mine expansion. Any additional modeling used for hydrogeologic characterization should include the elements for analysis noted for water balance modeling.

Air Quality

The EIS should include baseline air quality data previous to mine operations as well as data from existing monitoring reports. The EIS should identify any anticipated issues based on past practices and what mitigation would be used. The EIS should also disclose current operation plans used to minimize/constrict air emissions and fugitive dust and how they may be revised for the expansion.

Financial Assurance

NEPA provides for the disclosure to the public and decision-makers all information concerning environmental consequences of a proposed action before the decisions are made and before actions are taken. NEPA does not directly refer to disclosure of financial assurances. However, a key component to determining the environmental impacts of a mine is the effectiveness of closure and reclamation activities, including long-term water management. The amount and viability of financial assurance are critical factors in determining the effectiveness of reclamation and closure activities and, therefore, the significance of the environmental impacts.

We recommend that the NEPA analysis disclose the estimated cost to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives. The proposed financial assurance mechanisms should be identified. The analysis should disclose costs associated with implementing the reclamation plan, as well as costs associated with implementing contingency measures to deal with reasonably foreseeable but not specifically predicted outcomes. This is necessary to inform the public and decision-makers of the financial risk to the public posed by conditions at the site. These financial assurances should be in a form that protects the public interest in the event that a company is unable to implement contingency measures or perform long-term operation and maintenance at a closed mine site. EPA believes that it is critical to anticipate environmental impacts that are reasonably foreseeable, yet not specifically predicted and to have financial assurance mechanisms in place to deal with such contingencies.

Conceptual Model

The NEPA analysis should include a conceptual model describing the cause and effect relationships between proposed mine expansion (for each alternative) and potential impacts and issues of concern. The conceptual model should describe the various pathways through which proposed mining activities could affect resources. The model would allow the reader to comprehensively view all possible actions associated with the proposed alternatives that could lead to resource impacts. The model would provide context for the more detailed analysis provided in the narrative. This type of model and supporting illustrations are very helpful for communicating to the reader the risks posed by various alternatives and the pros and cons of each alternative. It is also useful in describing the rationale for proposed mitigation and monitoring activities. For your reference, below is a link to EPA's guidance that provides recommendations for the effective development, evaluation and use of models in environmental decision making.

Guidance Document on the Development, Evaluation and Application of Environmental Models (PDF). EPA/100/K-09/003. March 2009.

http://www.epa.gov/crem/cremlib.html

Characterization of Ore, Waste Rock, and Tailings

In order to provide reliable projections of wastewater and solid wastes from the project, the physical and chemical characteristics of ore and wastes waste should be determined. Environmental samples used to support projections should represent a range of conditions that currently occur and that could occur in the future as a result of the project. Waste materials used for environmental projections should be generated from ore that is representative of the material to be mined and related to the mine plan and proposed processing methods. Physical and chemical characterization should be conducted in a manner that provides environmentally conservative estimates of impacts.

It may be helpful to consider the recommendations in the following report, Maest, A.S., Kuipers, J.R., Travers, C.L., and Atkins, D.A., 2005. *Predicting Water Quality at Hardrock Mines: Methods and models, uncertainties, and state-of-the-art.* 2005. Prepared for Earthworks. 77pp. Available online at: http://www.mine-aid.org/predictions/

The following are recommended analyses that may help you with characterization once questions in the study plan for geologic and mineralogy setting/aqueous geochemistry are developed.

• Whole rock analysis
• Mineralogy
• Drill core descriptions.
• Block model or similar model (a computerized estimate of the quantity and characteristics of ore and waste)
• Available literature on the ore deposit
• Mineral occurrences (e.g., on fracture surfaces, in groundmass, using hand specimens and thin section) with an emphasis on sulfides and carbonates
• Acid-base accounting
• Startup of long-term kinetic testing; possible startup of test pads if sufficient material an access to site are available

• Baseline surface and ground water quality and flows (including springs)
• Potentiometric surface for groundwater
• Hydraulic properties (e.g., hydraulic conductivity, porosity, permeability) of soil, vadose zone, and groundwater aquifers, especially under proposed locations of mine facilities
• Examination of characteristics of similar mines in region/area.
• Hydrogeochemical models for prediction of water quality.

Transportation of Hazardous Materials and Concentrates

A recurring problem at mine sites in the Northwest is related to transportation incidents involving hazardous materials. The NEPA analysis should characterize risks related to transportation incidents, and describe mitigation, response planning, and monitoring programs to mitigate for expected problems.

Roads/IRAs

The BLM/USFS letter identifies IRAs as a preliminary concern for this proposal. Road construction and reconstruction are of key concern to EPA because roads can be a large contributor of sediment to streams and interrupt the subsurface flow of water, particularly where roads cut into steep slopes. In addition, roads and their use contribute to habitat fragmentation, wildlife disturbance, the introduction or exacerbation of noxious weeds, and increased fire danger from recreational activities. We support limiting access to roadless areas in order to promote habitat and natural hydrologic infiltration and run off. The EIS should describe in detail the location of temporary and permanent roads and describe the need to encroach on IRAs and how that relates to the Forest Plan objectives.

Endangered Species Act

We recommend that the NEPA analysis clearly discuss and list in a table format the ESA listed species that occur in the project area. This section should be linked to habitat discussion and should include a discussion of what activities are being proposed to avoid impacting listed and sensitive species.

Monitoring

The NEPA analysis should describe project monitoring in some detail. We recommend as a general rule that the level of effort afforded monitoring be commensurate with the complexity of the project and the risk to and sensitivity of the affected environment if a project is permitted and/or approved. As a first step, we recommend that the NEPA analysis clearly define the goals and objectives of monitoring, and present an overall monitoring strategy for the project. Second, the NEPA analysis should provide enough detail on the monitoring program for reviewers to evaluate whether the goals and objectives of monitoring will be achieved. This can generally be satisfied by providing summary information on monitoring (including a list of measurement parameters, methods, locations, frequency), data analysis, and reporting. In addition, we recommend that alternatives include clear requirements for regular analysis and reporting of data to oversight agencies, and include a requirement that the operator submit a full sampling and quality assurance plan for agency approval. The NEPA

analysis should discuss who will conduct monitoring, the frequency and how monitoring will direct management decisions.

Disclosure of Uncertainty

For all predictions of effects, regardless of whether they are qualitative or quantitative, the NEPA analysis should disclose the limitations of the predictions, and the associated uncertainty. It should also disclose uncertainty or risk associated with implementation of mitigation measures Sources and magnitude of uncertainty should be discussed. Understanding of uncertainties and risks are absolutely necessary for informed decision-making. If uncertainty cannot be reduced by data collection or analysis, it may be possible to mitigate for some uncertainty by developing an alternative or imposing mitigation measures that include monitoring, and contingency planning (see discussion below).

Adaptive Management Planning

The NEPA analysis should describe the strategy for responding to unforeseen circumstances at the site. Adaptive management and contingency planning are particularly important for projects with likely impacts to Endangered Species Act (ESA) species, and for projects that carry a high level of uncertainty in predictions of environmental consequences. The strategy should include "trigger levels" (e.g., exceedences of ecological benchmarks) or observations (e.g., statistically significant trends in indicators, permit violations, water balance problems, changes in discharge or chemistry of springs/seeps) that would set in motion a follow-up action. This strategy or plan should be described so that reviewers may comment on its adequacy. This type of plan when coupled with the monitoring program is necessary to mitigate for uncertainties and risks associated with predictions of environmental outcomes, and will provide an early warning system of unexpected outcomes. Such plans are necessary to ensure that post-mining land use objectives can be achieved and sustained in the future.

Cumulative Impacts

The current project exists on federal, state and public land. A cumulative effects analysis should be done for potential impacts to natural resources due to potential foreseeable actions (e.g. expansion of mine on private land or other ground disturbing action that could natural resources) regardless of what agency (Federal or non-Federal) undertakes the action (40 CFR § 1508.7). We recommend that projects that will be covered by the proposed action utilize the best available science through effective watershed hierarchy and a watershed approach when identifying, quantifying and mitigating cumulative impacts. EPA has issued guidance on how we are to provide comments on the assessment of cumulative impacts, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*, which can be found on EPA's Office of Federal Activities home page at: http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf. The guidance is a good tool to assess the adequacy of the cumulative impacts assessment in five key areas. EPA tries to assess whether the cumulative affects analysis:

1. Identifies resources if any, that are being cumulatively impacted;

2. Determines the appropriate geographic (within natural ecological boundaries) area and the time period over which the effects have occurred and will occur;
3. Looks at all past, present, and reasonably foreseeable future actions that have affected, are affecting, or would affect resources of concern;
4. Describes a benchmark or baseline;
5. Includes scientifically defensible threshold levels.

We recommend that BLM review the guidance and include requirements in the NEPA analysis to assure these areas are addressed in the cumulative effects analysis for proposed projects.

Climate Change

The EIS should describe the current conditions related to climate and future predictions of climate shifts in the Northwest. Potential effects of climate change may include changes in hydrology, sea level, weather patterns, precipitation rates, and chemical reaction rates. CO2 concentrations also lead to preferential fertilization and growth of specific plant species. The cumulative effects analysis should include a discussion on potential changes in precipitation, stream flow, changes in vegetation and wildfire frequency. A key component of site restoration involves success of revegetation to reduce erosion and impacts to the surrounding environment. We recommend that adaptive management be built in to post closure monitoring and management so that measures can be taken in response to potential changes in site conditions that results in mass wasting and affects to COPC source control measures.

It is reasonable to expect that construction of the mine and ongoing mine operations will result in greenhouse gas (GHG) emissions. These emissions should be disclosed in the EIS (metric tons CO2 equivalents/yr). We recommend implementing measures to reduce GHG emissions and offer the following for consideration as components of a construction air pollutant emissions control plan.

- Evaluate the use of available alternative engines and diesel fuels:
    - Diesel engines that meet the proposed EPA 2007 regulation of 0.01 g/bhp-hr (grams per brake horsepower hour)
    - Diesel engines outfitted with catalyzed diesel particulate filters and fueled with low sulfur (less than 15 ppm sulfur) fuel
    - Fueling on-site equipment, e.g., mining equipment, with lower sulfur highway diesel instead of off-road diesel fuel
- Install control equipment on diesel construction equipment (particulate filters/traps (DPTs), oxidizing soot filter, oxidation catalysts, and other appropriate control devices to the greatest extent that is technically feasible.) Different control devices may be used simultaneously.
- See www.epa.gov/otaq/retrofit/index.htm for verification of technology retrofit emissions reductions related to any project mitigation measures.
- Establish idling limit (e.g., 5-10 minutes per hour).

- Prohibit any tampering with engines and require continuing adherence to manufacturers' recommendations.

Consultation with Native American Tribes

The NEPA analysis should discuss not only the historical structures that exist in the project area but also cultural resources and impacts to Native Americans. The NEPA analysis development should be conducted in consultation with all affected tribal governments, consistent with Executive Order (EO) 13175 (*Consultation and Coordination with Indian Tribal Governments)*. EO 13175 states that the U.S. government will continue to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights. Documentation of these consultations should be included in the document prepared under this action. Consistent with the July 28, 1999 memorandum from the Council on Environmental Quality (CEQ) to Heads of Federal Agencies, we strongly urge the Services to consider inviting affected Tribal governments to participate in the NEPA analysis development process as cooperating agencies. This would provide for the establishment of a mechanism for addressing intergovernmental issues throughout the planning process. The NEPA analysis should identify Tribal concerns and issues and discuss how these will be mitigated.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: ECO-088 01-012-AFS

Thomas Puchlerz, Forest Supervisor
Tongass National Forest, Supervisor's Office
648 Mission Street
Ketchikan, Alaska 99901-6591

Dear Mr Puchlerz:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (EIS) for the *Greens Creek Tailings Disposal* (CEQ #030181) in accordance with our responsibilities under the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. The draft EIS examines changing the existing Greens Creek Mining Company Plan of Operation to create additional space for tailings disposal, thus facilitating the continued operation of the Mine. The draft EIS identifies Alternative C, the alternative that proposes adding carbon to enhance immobilization of dissolved metals, as the preferred alternative.

We have helped your Agency develop parts of the EIS that deal with water quality as a cooperating agency due to our knowledge and authorities concerning water quality and the Clean Water Act. We submitted several sets of comments on preliminary versions of the draft EIS. These comments focused on ensuring a balanced presentation of some key but very complex technical issues, including the degree of uncertainty associated with some of the draft EIS findings.

We have rated the draft EIS, EC-2 (Environmental Concerns-Insufficient Information). We base our environmental concerns on:

- Uncertainty about whether water would meet AWQC (Alaska Water Quality Criteria) for sulfate and selenium
- Missing information associated with the preferred alternative on water quality impacts for eight key parameters;
- Inconsistent use of AWQC and NPDES effluent limits;
- Uncertainties about the source, type, amount, and placement of carbon (associated with the preferred alternative) to effectively immobilize dissolved metals, and
- A confusing and overly technical discussion of pyrite circuits which

effectively prevents comprehension and consideration by lay readers.

It is our understanding from participating as a cooperating agency, from statements on pages 2-11 and 4-14, and from discussions with Bill Oelklaus, Environmental Manager for Kennecott Greens Creek Mining Company (KGCMC), that the existing treatment system would be used in conjunction with Alternative C if necessary to ensure attainment of AWQC until such time as project post-closure monitoring indicates such treatment is no longer necessary. This critical mitigation measure must be spelled out clearly in the preferred alternative. Furthermore, bonding for potential long-term waste water treatment should be part of any Forest Service and/or State permit for the project. Please clarify these points in the final EIS. EPA would have environmental objections to Alternative C without the use of the existing treatment system because the draft EIS predicts it would result in exceedances of AWQC at the point of compliance.

We appreciate the opportunity to review this draft EIS and participate in the development of this EIS as a cooperating agency. We are interested in continuing to work with the Forest Service to resolve these issues. Please feel free to call Bill Riley, Regional Mining Coordinator, at (206) 553-1412, or Chris Gebhardt, lead NEPA reviewer, at (206) 553-0253, to discuss our comments and how they might best be addressed.

Sincerely,

Judith Leckrone Lee, Manager
Geographic Implementation Unit

cc: Stan Foo, DNR
Pete McGee, ADEC
McKie Campbell
Bill Oelklaus, KGCMC
John Leeds, ACOE

EPA Detailed Comments on the Draft Environmental Impact Statement for the Greens Creek Tailings Disposal

General Comments

Predictions that the Preferred Alternative Would Exceed the Sulfate Standard

The draft EIS predicts that the preferred alternative would result in water quality that exceeds the Alaska Water Quality Criteria (AWQC) for sulfate at the point of compliance (i.e., the lease boundary). The final EIS should include design elements, including mitigation measures, that ensure that the preferred alternative would meet applicable AWQC both during operations and after closure. As stated in the cover letter, it is our understanding that Kennecott Greens Creek Mining Company (KGCMC) intends to rely on the existing waste water treatment plant to assure compliance with AWQC and also intends to examine the use of passive wetland treatment systems as a potential means of effectively treating runoff and leachate from the tailings pile. These measures need to be described and incorporated into the action alternatives along with data that demonstrates that AWQC will be met for sulfate after treatment. This is discussed in more detail below.

Critical Water Quality Information Missing for the Preferred Alternative

The draft EIS lacks predictions of water quality impacts associated with the preferred alternative for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver (see p. 4-27). The preliminary draft EIS contained this information so it is apparently an oversight. The final EIS must include water

quality predictions for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver for Alternative C, the preferred alternative, and demonstrate attainment of AWQC for all parameters.

Inconsistent and Confusing Use of AWQSs and NPDES Effluent Limits

The draft EIS compares the water discharged from the tailings pile to freshwater AWQC for each alternative to determine exceedences but then compares the loading to the current permit which uses marine AWQC as its basis for calculations. Either the discharges from the pile are going to the freshwater environment surrounding the pile (making the comparison to marine water irrelevant) or they are going to the marine environment (making the freshwater standards irrelevant). It is very confusing to read that the discharge won't meet AWQC but when compared with the "allowable" loads, they were less than "some small" percent of those prescribed in the current permit. The final EIS should explain what set of criteria - marine or freshwater - is relevant to protect beneficial uses and then consistently use those standards for comparison purposes.

Use of Existing Water Quality Treatment to Ensure AWQCs Are Met

The draft EIS rarely discusses using the existing water treatment plant, if needed, to ensure attainment of AWQC. Readers could question whether continued use of water treatment is actually proposed. Descriptions of the tailings pile in the alternatives chapter (Figure 2-5) indicate that the tailings pile would cover the location of the existing water treatment plant. Only Alternative B addresses this problem by relocating the treatment plant. This oversight could also raise questions in the readers' mind about whether the preferred alternative would include using water treatment if needed. The final EIS must explicitly and clearly describe water treatment for all alternatives in chapter two, identify the new location of the water treatment plant, describe the overall effect on water quality from proposed actions and mitigation measures (including water treatment), and demonstrate that the mine is sufficiently bonded to operate the water treatment plant for as long as necessary.

Uncertainty about the Method and Effectiveness of Carbon Addition

The EIS indicates that the preferred alternative would employ an adaptive management approach for adding carbon to enhance immobilization of dissolved

metals. This strongly contrasts with the specific direction in Alternative D for carbonate addition where the final EIS specifies the amount of carbonate needed to fully neutralize the tailings and prevent the onset of acid rock drainage (ARD). To ensure that the preferred alternative would successfully deal with the potential for ARD and metals mobilization, the final EIS should answer as many questions as possible related to the feasibility and effectiveness of carbon addition. For example, the final EIS should describe more specifically how amending the tailings with carbon leads to sulfate reduction, where such an approach has been used and with what success, describe potential sources of carbon, their respective methods of application, and provide a rough estimate of the amount of carbon that might be needed. This section should describe the types of sulfide reducing bacteria that occur in the pile and the potential for the proliferation of other bacteria that could deter or perhaps reverse the sulfate reduction process (e.g., Thiobacillus ferrooxidans).

Confusing and Overly Technical Discussion of Pyrite Circuits

The discussion about pyrite circuits is overly complex. The EIS should summarize and simplify the discussion with flowcharts and diagrams that explain the basic physical and chemical processes in a pyrite circuit, a chart summarizing the differences between the pyrite circuit alternatives, and a simple explanation of why the pyrite circuit alternative was not considered in detail.

Monitoring

The draft EIS states (Page 2-35, Section 2.3, Monitoring) that no new monitoring plan has been developed because the existing plan is functioning appropriately. The final EIS should strive to incorporate up-to-date monitoring data that correctly depict the impacts of the current facility. Freshwater Monitoring Plan monitoring data for 2001 were only recently released in a 2001 annual report and this release followed preparation of the draft EIS. The final FEIS would benefit from inclusion of an evaluation of those results and other monitoring data at least through 2002 or even early 2003. Including up-to-date data would better disclose current conditions, anticipate impacts related to expansion alternatives, and indicate any need for increased monitoring. With this comment in mind, it is noted that Section 3.8 on ground water quality summarizes information on the occurrence and interpretation of elevated sulfate conditions in what would appear to be virtually all downgradient ground-water directions from the tailings pile, including north, south, and west. Though the interpretations presented in the draft EIS (page 3-42) suggest only contaminant sources other than leakage from the tailings pile, up-to-date monitoring information could help eliminate alternative explanations and could indicate that areas should receive improved monitoring coverage to amply measure the water conditions or to answer still unanswered questions. The same need to have up-to-date monitoring information applies to surface water, particularly the Hawk Inlet Catchment as described on page 3-46 and 3-47 of the draft EIS.

Interim Closure Measures in the Event of a Temporary Shut Down

The Greens Creek Mine is an underground zinc/silver mine. The EIS should describe the potential impact of current historically low zinc prices on the continued operation and reclamation of the Mine. The EIS should also describe specific measures that would be taken in the event of a temporary suspension of operations to prevent oxidation of tailings, as is required by the ADEC solid waste permit. This is critical since the continual addition of fine-grained tailings to the pile helps to impede oxidation.

Specific Comments

The draft EIS does not contain a summary as required by 40 CFR 1502.12. The final EIS should include a summary.

Page 1-1 explains the mining process - ore concentrate would be trucked approximately nine miles to the Hawk Inlet port at the Cannery, etc. The EIS should describe these connected actions and the additional impacts from continuing to mine ore reserves beyond those described in earlier NEPA documents.

Page 1-2 states that the remaining storage is estimated to last roughly 2 years versus 4 years on page 3-4 of the PDEIS. Please explain why.

Page 1-5 states the purpose and need statement. The proposed action entails changing the plan of operation, not merely considering changing the plan of operation. The purpose and need statement should be written in a more active way.
Page 1-5 states that permitting this expansion would require modifying the existing lease. Is this a decision to be made based on information in this EIS?. We recommend that the EIS succinctly identify all the decisions to be made using a bulleted format.

Page 1-6 states that before the proposed expansion could begin, the existing reclamation plan would need to be updated to set performance criteria for achieving AWQC. The EIS should explain when and how performance criteria would be set.

Page 1-8 describes the engineered cover or cap. This section should quantify the amount of water running off the cap and describe the extent that evapotranspiration and cap design are reducing the water flowing off the cap.

Page 1-14 could also describe EPA's Section 309 and NEPA review responsibilities.

Page 1-15 states that discharges must meet all effluent limitations including technology standards for water quality. Technology-based effluent limitations

and water quality-based effluent limitations are different and both must be met to satisfy the CWA.

Page 1-16. Section 1.6.2 should be revised to reflect the current State structure.

Page 2-1, Section 2.1, Issues and Alternatives Development. Under Water Quality, The draft EIS notes that the process of greatest concern is sulfide oxidation which can lead to the release of sulfate and heavy metals into water. The release of acidity should also be added to the list.

Page 2-2 states that sulfate reduction helps to reduce the concentrations of critical metals, especially zinc. This sentence should explain how sulfate reduction helps to reduce the concentrations of critical metals.

Page 2-2 describes the no action alternative. The EIS should state how long the mine could operate until limits to the size of the tailings pile would force operations to cease.

Page 2-5 states that 29 acres of the permitted 56 acres would be used for the tailings pile. This section should briefly state how the other 27 acres would be used.

Page 2-11 states that Alternative B would entail continued treatment of tailings contact water during operation but does not describe or summarize the existing treatment system. The EIS should do this.

Page 2-11 should define what is meant by phreatic levels.

Page 2-12 states that Alternative C would utilize the post-closure construction of an engineered soil cover on the pile to minimize infiltration of oxygen and water into the pile. The EIS should describe the type of soil proposed to be used, the effectiveness of the soil in minimizing oxygen and water, the availability of this soil, and the cost of the cap (to address economic feasibility and reclamation concerns).

Page 2-12 states that this alternative aims for long-term chemical stability of the tailings through a continuous addition of carbon. Ideally, the EIS should describe how carbon would be transported from the Cannery, the extent of the carbon supply, the amount added, and the longevity of the carbon in the pile. However, the EIS states that results from a sulfate reduction monitoring plan (SRMP) would determine the amount of carbon used. The EIS should state at least conceptually how carbon could be injected into the pile.

Page 2-13 states that when compared to the proposed action, this alternative would reduce both the lease area and the disturbed area within the Monument by approximately 22 acres, and increase the lease area and disturbed area outside the Monument by 4.8 acres. It appears that changing the location of the footprint could minimize the extent of impacts within the Monument for the other alternatives. The final EIS should state if redesign could minimize impacts to the Monument.

Page 2-15. Figure 2-4 shows that the tailings footprint covers the existing water treatment plant but the list on this page does not indicate that relocating this plant is part of the plan. What happens to it?

Page 2-19 identifies one element of Alternative C as the construction of a new water management pond system. The EIS should describe the system to a greater extent including if ponds are lined or unlined.

Page 2-19 states that it is anticipated that additional carbon from an external source will be required to assure long-term sulfate reduction and chemical stability of the tailings disposal facility. The EIS should identify the potential types and location(s) of the external source of carbon, identify how much could potentially be needed, and the possible range of associated costs.

Page 2-19 states that the SRMP would determine the best form of supplemental carbon addition, the required amount, and the best method of application. To the extent possible, this information should be in the EIS. For example, the EIS should identify the best supplemental carbon addition and its application based on sample testing and available carbon sources and predict a range of possible quantities based on chemical analysis.

Page 2-19 states that post-closure water quality meets applicable effluent limits in the Kennecott NPDES permit. The current permit, however, contains effluent limitations applicable to a discharge to marine waters, not fresh waters. This is a source of confusion.

Page 2-20 states that about 2 million tons or 1 1/2 million cubic yards of limestone would be needed to sufficiently neutralize the tailings. The EIS should explain why it can specify quantities for limestone addition but not for carbon addition - the preferred approach for avoiding metals mobilization.

Page 2-20 states that tailings placement and pile height would be the same as Alternatives B and C. The first paragraph of this section, Figure 2-6 and Table 2-1, all say that the tailings placement area increases. Please reconcile these different statements.

Page 2-25. Section 2.2.1, Figure 2-7 shows the relocated treatment plant for Alternative B but relocation of this plant is not shown on any of the other figures for other alternatives even though the area where it is now located is proposed to be covered with tailings.

Page 2-27 discusses cap design as a method to protect surface water. The final EIS should

predict precipitation uptake through evapotranspiration. It should also predict how much precipitation would infiltrate through the cap following vegetation.

Page 2-27 states that drainage water will continue to be captured through the drain system, flow into the wet-wells, and subsequently be transferred to the water treatment plant. The EIS should state if drainage systems would be maintained after mine closure and if money is set aside to ensure that such maintenance occurs.

Page 2-28 describes the cap layers. The EIS should state if material is readily available to construct each layer of the cap.

Page 2-31. Define what are "-3" and "-2" materials.

Page 2-32 states that the company will identify sites that exhibit an existing ability to maintain enough water year-round for effective reestablishment of a wetlands environment. The EIS should contain this information.

2-33. Section 2.3 states that the company continually analyzes water quality. Is monitoring happening continually (i.e., indefinitely in time without interruption) or frequently? The EIS should explicitly state how often monitoring occurs happens (e.g., the company analyzes water quality weekly, monthly, etc.).

2-33. Section 2.4.1 See comments about AWQC in general comments. Moreover, it is very confusing to read that the discharge would not meet AWQC but when compared with the "allowable" loads, they were less than (some small percent) those prescribed in the current permit. The final EIS should explain what set of standards is relevant to protect beneficial uses and then consistently use those standards for comparison purposes.

Pages 2-33 - 2-35 discuss water quality. It is difficult to understand the effects of different alternatives on water quality, especially compliance with AWQC, due to ambiguities about whether or when treatment occurs, marine discharge versus freshwater discharge, and the location of the point of compliance.

Pages 2-38 - 2-50 discusses pyrite circuit scenarios. This section is overly complicated to the extent that it precludes understanding by non-technical readers. The EIS should include flowcharts and diagrams that explain the basic processes of a pyrite circuit and what happens chemically and a chart summarizing the differences between the pyrite circuit alternatives.

Page 3-1 states that the Greens Creek Mine is an underground zinc/silver mine. The EIS should describe the potential impact of current historically low zinc prices on the continued operation and reclamation of the Mine. The EIS should also describe specific measures that would be taken in the event of a temporary shutdown to prevent oxidation of tailings, as is required by the ADEC solid waste permit.

Pages 3-1 and 3-2 list issues. We recommend that the EIS list issues in order of importance, from most important to least important.

Page 3-4. Recommend that Table 3-1 also include annual precipitation.

Page 3-4. The title of Table 3-1 states that it contains the data from 1994 - 2000 yet the table only shows 1997 - 2000 data. The final EIS should include data from 1994-1997 or change the title, and, if possible, include more recent data.

Page 3-7 states that the project site area has been designated as having attained air quality standards, or as being unclassifiable for all criteria pollutants. The final EIS should define "unclassifiable" for those readers unfamiliar with the Clean Air Act.

Page 3-15 should read, "Turbidity averaged 0.556 Nephelometric Turbidity Units."

Page 3-15 should explain why lead concentrations in Hawk Inlet and outside the sill vary, with location, from below detection limits to near acute levels.

Page 3-7 should state if the tripling of lead in polychaete worm tissue is attributable to mine activities.

Page 3-17 should estimate the percentage of argillites and phyllites in the ore rock and the overall buffering capacity these geologic layers would provide.

Page 3-18 discusses treated water discharging into Hawk Inlet. The EIS should explain how water is currently treated.

Page 3-23 should explain or define "quiet water marine".

Page 3-31. The EIS should explain why a map of Alternative B is in the affected environment chapter.

General. Including the applicable water quality standard on charts discussing water quality

would be extremely useful to reviewers to understand unacceptable pollution levels.
Page 3-42 should state when the source of the sulfate in the Pit 5 area will be confirmed by excavating test pits and conducting additional geochemical and water quality analyses.

Page 3-47 should explain why the lower pH caused by the old access road constructed of rock containing pyrite is not indicative of the reaction that may be occurring in the tailings.

Page 3-49 states that Vos estimated that acidification would not occur for more than 10.9 years, which would provide ample time for application of site closure technologies (e.g., the cover) to mitigate the ARD risk. The EIS should clarify how there would be "ample time" if mining is to occur for an additional 22 years before placing the cover on the tailings pile.

Page 3-50, Section 3.8, Water Quality. The DEIS uses paste pH measurements of tailings (shown in Figure 3-14) to support the concept that the tailings will neither acidify during operations nor for an indefinite period after closure. The same data are used in Appendix B (Michael Baker, Inc, 2003, pages 25-26) to conclude that the tailings have maintained an alkaline pH throughout the operation of the facility. However, these data may be somewhat misleading in that a check on the source of the most recent paste pH values shown in Figure 3-14, those from 1999, are listed in the Shepherd Miller, Inc (2000) reference as rinse pH rather than paste pH values. The paste pH values for the 1999 tailings samples, as listed in the Shepherd Miller reference, are all lower in pH than the rinse pH values, and none are alkaline. Interpretive statements based on an assumption of alkaline paste pH for tailings should be corrected in the EIS. The EIS should verify data and interpretive statements that have been carried over from previous reports.

Figure 3-13 on page 3-51 should explain why more recent data points are indicating more acid generation potential.

Page 3-58 should explain why zinc is not liberated in the milling process if argillite contains abundant amounts of it.

Page 3-63 references Appendix D, the Jurisdictional Wetlands Survey. Appendix D is the Sensitive Plant Species Survey, Appendix A is the Jurisdictional Wetlands Survey.

Page 3-64 and 3-67 describes wetland and general plant associations, respectively. The EIS should contain maps identifying these plant complexes.

Page 3-67 references Appendix D, Wetlands. Wetlands is in Appendix A, not Appendix D.

Page 3-74 should describe the general population trend of Sitka black-tailed deer and waterfowl and shorebirds. The EIS should also state if the increase in deer accidents in the Year 2000 was attributable to an increase in the deer population.

Page 3-76 should spell out the Red-br. Sapsucker.

Pages 3-78 and 3-80 both contain section on Marine Mammals and describe species listed under the Endangered Species Act. The EIS should consolidate its Marine Mammal section and identify species protected under the Marine Mammal Protection Act.

Pages 3-80 and 3-81 state that staff have observed few Steller sea lions transiting near the mouth and within Hawk Inlet every year but paragraph 4 on page 3-85 states that when the salmon are running, sea lions are abundant inside the Inlet. The EIS should reconcile these statements.

Page 3-83 should define seafloor features.

Page 3-89 references Section 3.1 (Oceanography). Section 3.6.7 is Oceanography not Section 3.1 (Location). The final EIS should correct this.

Page 3-94 should explain why Table 3-14 contains only pre-mining data when data is collected annually.

Page 3-95, Section 3.13.6 is entitled "Summary of Freshwater Environment" but does not discuss Essential Fish Habitat, the subject of Section 3.13. Subsection 3.13.6 should summarize Essential Fish Habitat (EFH) in both marine and freshwater environments.

Page 4-1 should state what the life of the mine would be if Alternative A is adopted.

Page 4-3, Section 4.1.1 - The discussion of effects in ➢3 is also included in ➢1. The final EIS should consolidate these discussions.

Page 4-5 discusses connected actions (past, present, and reasonably foreseeable future). The EIS should discuss the possibility of a shutdown caused by historically low zinc prices.

Page 4-8 should discuss who would view the altered landscape and the impact of altered views on the viewers. For example, the EIS should state if the view would affect the attractiveness of the area to cruise liner passengers and people on guided tours.

Page 4-10 identifies the need for a monitoring program to measure metals uptake by wetland communities and stream sediments, and bioaccumulation. The EIS should also identify follow-up actions for contingencies that occur and are detected by the monitoring plan.

Page 4-11 should explain why the model developed by Environmental Design Engineering did not consider carbon addition.

Page 4-11 should contain a flow chart identifying what models are used for different points in the hydrologic cycle (e.g., precipitation, infiltration, etc.).

Page 4-12 discusses a time frame of 50 to 500 years. The EIS should state if changes already occurring due to global climate change have been factored into the models.
Page 4-13. See comments above from Chapter 3 on comparing the freshwater AWQS and technology-based loading limitations.

Page 4-14 states that Kennecott Mining will continue an appropriate method of water treatment until the tailings effluent can be discharged without treatment so that applicable AWQC are met. The draft EIS never fully identifies applicable AWQC, instead making comparisons to both freshwater AWQC and the loading limits of the current permit for discharges to marine waters (not the marine water AWQC).

Page 4-14 should state how surface water runoff from the pile would be treated.

Page 4-16. Table 4-2 and other water quality tables should highlight the text differentiating the tables (e.g., underdrain flow and downgradient groundwater).

Page 4-18 should explain Table 4-2.

General. The EIS shows that the level of some pollutants for all alternatives would exceed water quality standards. EPA will object to degraded water quality. The EIS must show how the preferred alternative would meet water quality standards.

Page 4-21 references Appendixes B for the ADEC permit. Appendix F contains the ADEC permit - not Appendix B. The final EIS should correct this.

Pages 4-26 and 4-27 contain the same table. The EIS lacks a table showing the effect of Alternative C on water quality for antimony, chromium, copper, lead, mercury, nickel, selenium, and silver. This water quality information for the preferred alternative is critical.

Page 4-33 should indicate whether proposed activities are covered under an existing nationwide permit. In addition, the EIS states that these wetlands received a "low" value rating in the functions and values analysis partly because of their proximity to existing disturbance. The EIS should discuss the total impairment to wetlands in the cumulative effects section.

Page 4-34 states that activity associated with the proposed stormwater pond system would fill approximately 300 linear feet of high value riparian wetland. The EIS should describe this high value wetland in the text description for other alternatives and show it on maps.

Page 4-43, Section 4.10 states that any discharge will be required to meet the AWQC for the protection of the marine uses (listed in 18 AAC 70.020). This document, however, never uses these standards for comparison purposes. The tables in Chapter 4 use the freshwater criteria and the loading limits of the current permit. The loading limits of the current permit use an authorized mixing zone making the technology-based limits, which are not subject to mixing zones, more stringent than the water quality-based limits for many parameters.

Page 4-45 contains a section on the socio-economic impact. The EIS should state the effect on recreational opportunities, if any exist, from expanding the mine and the tailings pile.

Page 4-48 and 4-49 spends one page of text defining cumulative effects in the context of the project rather than describing them. The information here is insufficient. Recommend that this section be significantly altered to describe the effect on resources of concern over time and space. Focus on how water quality, monument values, and wetlands have been impacted over time due to various activities.

Page 4-50 should also include the Marine Mammal Protection Act as part of Section 4.16.3.

Page 4-51 section 4.16.4 describes future actions not future cumulative impacts. The little effects' analysis focuses on socioeconomic effects. This and other cumulative effects pieces should be developed around resources rather than activities and focus on the environmental aspects.

Editorial Comments (No response to comments necessary.)

Page 2-6. Change "however the height would increased by 80 feet above original ground surface to about 160 feet"to "however the height would be increased from 80 feet above the original ground surface to about 160."

Page 2-11. Correct the format of bulleted text.

Page 2-13. Change sentence to read, "(approximately 12 years at present rate of production for known reserves and 10 years for potentially developing undiscovered reserves)."

Page 2-19, ◆3. Correct "system.Installation".

Page 2-23. Correct "a low permeability liner would required".

Page 2-28, Footnote 1. Correct "spruce trees are typically very shallow Greens Creek has informally".

Page 2-31. Change the different font inside the parentheses at the top of the page so it is consistent with the rest of the text.

Page 3-63. Correct misspelled "Habitats of the Unites States".

Page 3-79. Change the font of "Polystichum aleuticum" so that it is the same size as the other text.

Page 3-88. Place a space between "Road Mile" and "7.2".

Page 3-93. Replace the ":" with a "." for the text "flows at about 1:0 cfs".

Page 3-100. Replace the "0" in "0ver 95 percent" with an "O".

Page 3-100. Remove the "," after "commercial fishing vessels, (George, 1982)".

Page 3-101. Remove the "e" and replace "predominate" with predominant" in "residents are e predominate users".

Page 3-102 and other locations. Consistently use ADF&G or ADFG.

Page 4-6. Add a "." in "Admiralty Island National As shown".

Page 4-15. Remove the "and" from "Alternative A are shown in Table 4-2 and ."

Page 4-15. Remove the second “discharge” from “marine discharge discharge permit”.

Page 4-42. Change the word “form” to “from” in “pressure form harvesting”.

Page 4-47. Remove the word “the” in “more than the under the no action”.

Page 4-50. Correct the phrase “that govern general land used in (http: . . .).”

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

November 19, 2010

Sarah Samuelson
Interedisciplinary Team Lead
Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

Re: Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for the Greens Creek Mine Tailings and Waste Disposal Expansion.
EPA Project Number 01-012-AFS

Dear Ms Samuelson:

The U.S. Environmental Protection Agency (EPA) has reviewed the NOI for the expansion of Greens Creek Mine located on Admiralty Island within the Tongass National Forest. Our review was conducted in accordance with EPA responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA).

Greens Creek mine is an underground mine that has been operating since 1987, there have been several NEPA iterations throughout this time. The most recent EIS analyzed a proposed expansion to extend the mine life 10 years and a Record of Decision (ROD) was signed in 2003. The current proposal would double the current facility and allow for approximately 15 to 20 million tons of tailings and waste rock. The analysis evaluates activities over the next 30 to 50 years and will tier to the 2003 EIS. EPA is a cooperating agency for the development of the current EIS due to our expertise in water resources and Clean Water Act (CWA) regulations. We appreciate the time that you and Forest Service staff have spent engaging EPA in the pre-scoping meetings and site visit. These ongoing meetings and the additional information that we have been provided (e.g., the 2009 Environmental Audit) have helped us understand the context of the expansion, current conditions at the site, and issues that will be analyzed in the EIS. We again stress that we believe this EIS should be a stand alone document due to the need to update information from results of subsequent studies at the site since the 2003 EIS and the need for a thorough analysis of reclamation and potential post closure, long term water treatment.

Water quality is one of EPA's principal concerns at this facility. EPA's concerns with water quality from mine facilities are based on the existence of acid generating waste rock, impacts to waters of the U.S. from expanded facilities, waste rock disposal site stability, and the potential need for long-term water treatment. In addition to meeting statutory requirements under the CWA, we believe that adequate mitigation including sufficient financial assurance (FA) is crucial to protecting the public's resources. Our recommendations regarding water quality, modeling, and mitigation are highlighted below.

Existing Water Quality Data, Monitoring and Modeling

A considerable amount of data already exists since Greens Creek is an active mine, which provides the opportunity to evaluate and utilize available water quality data to support modeling and evaluate predicted impacts. It will be important to evaluate the existing dataset to ensure that they are of the appropriate type and quality to support intended uses. It will also be very helpful to categorize and synthesize the existing data. We acknowledge that there will be a project website and we believe this will be a good tool for making data, technical reports, and other documents related to the analysis available. To facilitate a user friendly share site, we recommend that the presentation be organized by resource area or project portion in a way that clearly shows which information is most relevant and with documents that are clearly labeled. It would also be useful to provide a summary of the referenced report and data in the EIS and make relevant reports easily available to the public.

A recent environmental audit was provided to us for reference[1] and the executive summary lists findings related to mine activities and site condition along with a significance level rating. The report notes that findings in the report were from the time the audit was conducted and we understand that remedies and adjustments to operations may have already been implemented. The findings in brief include seepage exceeding Alaska Department of Environmental Conservation (ADEC) water quality standards, uncertainty regarding weathering rates, potential instability of waste rock pile, potential contamination of stormwater, and uncertainty regarding long term water treatment. Many of the issues in this report reflect our concerns and we look forward to follow up regarding resolution of findings and related issues, and what mechanisms will be in place to address them. From our understanding, one of these remedies included testing a sulfate reduction technique via carbon amendment of waste rock. We are interested to learn the viability of this option or other options that are being explored to reduce solubility of metals to water resources. We strongly recommend that issues from this report be synthesized in the EIS and further analyzed to protect water quality and other natural resources. Furthermore, the EIS should include details of the monitoring plan that include triggers that would initiate a response and type of management response to avoid environmental degradation from the types of issues listed above.

The analysis will involve modeling to predict future impacts. Although some of it will tier to the 2003 analysis, we believe it is appropriate to conduct additional analysis based on more recent data collected and to fully analyze the effectiveness of reclamation/closure and post closure long term water quality. We would recommend that the EIS use caution in describing absolute outcomes based on modeling. Mathematical modeling used for describing the physical and chemical characteristics of the site and potential impacts includes a level of uncertainty; understanding these uncertainties and associated risks are necessary for informed decision making. We recommend when developing the study plan for the analysis that the plan clearly states the purpose, questions of concern, method, data, and limitations of the model to generate valuable interpretations. We also strongly recommend that an appropriately conservative approach be taken with modeling and that a range of predictive outcomes be discussed (e.g., most likely case, reasonable worst case, and reasonable best case scenarios) that reflect a range of climatic setti ngs and critical hydrogeologic and geochemical input values. Including a

[1] Environmental Audit of the Greens Creek Mine Final Report, March 2009.

reasonable range of outcomes allows the agencies to make better informed plans for mitigation, adaptive management, and contingencies to respond to reasonably foreseeable adverse impacts.

404(b)(1) Guidelines

The EIS should discuss how the analysis complies with CWA Section 404(b)(1) guidelines (Guidelines) and how impacts to waters of the U.S. would be mitigated. The proposed action includes expanding disposal of tailings into waters of the US and the EIS should explore alternatives and demonstrate the three tiered analysis to first avoid impacts, second minimize impacts, and last compensate for impacts. For purposes of the Guidelines it will be important to clearly demonstrate why alternatives that are carried forward are the least environmentally damaging practicable alternatives. "Practicable" does not necessarily mean the most cost effective. We will coordinate with the Corps of Engineers through our review of the 404 permit and alternatives developed to reduce impacts to surface water. The contact for EPA's coordination is Phil North, Wetland Ecologist, (email: north.phil@epa.gov). We recommend that the Corps of Engineers permit be closely coordinated with the EIS process and that the EIS include the analysis related to this permit.

Financial Assurance

EPA believes that financial assurance (FA) is an important element of the project and must be disclosed in the EIS. FA is an important component of the mitigation plan, and disclosing information on the costs and form of FA is essential for the public to understand and comment on the adequacy of mitigation, risks to the environment, and financial risks to the public. EPA believes it is not possible to fully evaluate anticipated effectiveness of the mine and reclamation plan and associated risks to the environment without this type of information.

EPA believes that it is critical to anticipate the reasonably foreseeable range of environmental impacts, and not just the specifically predicted or "expected case", and to have financial assurance mechanisms in place to deal with such impacts. Our experience with mining projects in the northwest[2] shows that a number of mines that have been permitted have developed significant problems or impacts that were not predicted during the NEPA process.

[2] Region 10 Mining Finanical Assurance Strategy, January 2009.

Please see Attachment 1 for our additional detailed scoping comments. Thank you for considering our recommendations and coordinating with EPA early in the NEPA process. We appreciate the opportunity to review reports and preliminary documents so that we can identify issues and assist in the development of the EIS. If you have any questions, please contact me at (206) 553-0205 or via email at mcwhorter.lynne@epa.gov or Alaska Mining Coordinator, Cindi Godsey at 907-271-6561 or via email at godsey.cindi@epa.gov .

Sincerely,

//s//

Lynne McWhorter, NEPA Reviewer
Environmental Review and Sediment Management Unit

Enclosure

cc: ADEC
USACE

EPA Scoping Comments on Proposed
Tailings and Waste Disposal Expansion

General Comments

The EIS should be a stand alone document and include any pertinent information from past analyses and data collection to facilitate a thorough review of the proposed operations and potential impacts. This includes a clear description of the environmental setting; past performance and current water quality issues; detailed mitigation, reclamation, and post closure activities; and existing and proposed mine operations. We understand that a certain level of reference to past reports is necessary in order to be concise. However, we believe it is important to have a current complete analysis that considers current conditions, mine operations as a whole including updated technology and facilities, and any updated permit requirements.

Purpose and Need

The NEPA analysis should include a clear and concise statement of the underlying purpose and need for the proposed action, consistent with the implementing regulations for NEPA (see 40 CFR 1502.13). In presenting the purpose and need for the proposed action, the NEPA analysis should reflect not only the purpose, but also the broader public interest and need.

Range of Alternatives to Protect Water and Air Resources

EPA recommends that the NEPA analysis evaluate reasonable alternatives and mitigation measures to reduce or minimize adverse impacts to groundwater and surface water, with special attention to areas where they may be hydrologically connected, and minimize impacts to air.

We recommend that the range of alternatives consider opportunities to reduce the footprint of disturbance, consider risks posed through each pathway, and incorporate treatment as a principal element to remove contaminants from waste streams to reduce post-closure monitoring and management obligations.

The NEPA analysis should clearly outline the physical design of current and proposed facilities (including waste dumps, disposal areas, water storage facilities), and address key questions related to water movement and water balance.

In evaluating proposed mine facilities the analysis should include an evaluation of methods for determining performance. This type of monitoring would provide an early warning system in case the proposed mine facilities do not conform to model predictions.

Financial Assurance

NEPA provides for the disclosure to the public and decision-makers all information concerning environmental consequences of a proposed action before the decisions are made and before actions are taken. A key component in determining the environmental impacts of a mine is the effectiveness of closure and reclamation activities, including long-term water management.

The amount and viability of financial assurance are critical factors in determining the effectiveness of reclamation and closure activities and, therefore, the significance of the environmental impacts.
The EIS should disclose the estimated cost to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives. The EIS should identify proposed financial assurance mechanisms and demonstrate that these mechanisms would ensure that necessary reclamation work would be completed. The analysis should disclose costs associated with implementing the reclamation plan, as well as costs associated with implementing contingency measures to deal with reasonably foreseeable but not specifically predicted outcomes. This is necessary to inform the public and decision-makers of the financial risk to the public posed by conditions at the site. These financial assurances should be in a form that protects the public interest in the event that a company is unable to implement contingency measures or perform long-term operation and maintenance at a closed mine site.

Modeling

There should be a site-specific conceptual model that describes the system boundaries, time and length scales, hydraulic and chemical characteristics, sources of data and data gaps, and the mathematical relationships used to describe processes. The documentation should include:

- tables of parameter values used in the model,
- tables and graphs of results,
- errors associated with both measured and assumed data, and
- recommendations for further analysis.

We recommend that a discussion on modeling include a clear statement of the management objectives intended to be achieved by the modeling, the level of analysis required to meet the objectives, and uncertainties associated with modeled outcomes. For your reference, please refer to EPA's guidance that provides recommendations for the effective development, evaluation and use of models in environmental decision making[3].

Characterization of Ore, Waste Rock, and Tailings

In order to provide reliable projections of wastewater and solid wastes from the project, the physical and chemical characteristics of ore and wastes waste should be determined. Environmental samples used to support projections should represent a range of conditions that currently occur and that could occur in the future as a result of the project. Waste materials used for environmental projections should be generated from ore that is representative of the material to be mined and related to the mine plan and proposed processing methods. Physical and chemical characterization should be conducted in a manner that provides environmentally conservative estimates of impacts.

Although much of the site characterization has been ongoing and data already exists for Greens Creek, because there is ongoing exploration, it may be helpful to consider the following

[3] *Guidance Document on the Development, Evaluation and Application of Environmental Models* (PDF). EPA/100/K-09/003. March 2009. http://www.epa.gov/crem/cremlib.html

recommendations[4] for characterization once questions in the study plan for geologic and mineralogy setting/aqueous geochemistry:

Whole rock analysis

- Mineralogy
- Drill core descriptions.
- Block model or similar model (a computerized estimate of the quantity and characteristics of ore and waste)
- Available literature on the ore deposit
- Mineral occurrences (e.g., on fracture surfaces, in groundmass, using hand specimens and thin section) with an emphasis on sulfides and carbonates
- Acid-base accounting
- Startup of long-term kinetic testing; possible startup of test pads if sufficient material and access to site are available
- Baseline surface and ground water quality and flows (including springs)
- Potentiometric surface for groundwater
- Hydraulic properties (e.g., hydraulic conductivity, porosity, permeability) of soil, vadose zone, and groundwater aquifers, especially under proposed locations of mine facilities
- Examination of characteristics of similar mines in region/area.
- Hydrogeochemical models for prediction of water quality.

Water Quality/Wetlands

The NEPA analysis should discuss current surface water quality and natural background conditions. Section 303(d) of the Clean Water Act (CWA) requires the States to identify those waterbodies which are not meeting or not likely to meet State and Tribal water quality standards. Impaired water bodies along with the pollutants of concern should be disclosed in the EIS. The NEPA analysis should discuss how a proposed project will identify which waterbodies may be impacted by the project, the nature of the potential impacts, and the specific pollutants likely to impact those waters. It should also include requirements to report those waterbodies potentially affected by the project that are listed on the State's current 303(d) list and whether Alaska Department of Environmental Conservation has developed a water quality restoration plan-Total Maximum Daily Load (TMDL) for the waterbodies and the pollutants of concern. If a TMDL has not been established for those waterbodies impacted by a proposed project, on the 303(d) list, as is the case here, then in the interim until one is established, the analysis must include an evaluation of whether or the extent to which the project would achieve requirements that there will be no net degradation of water quality to the listed waters.

The analysis should evaluate impacts to surface water quality and ground water quality from the proposed operations. The proposed operations include not only traditional mining operations, but also impacts related to on and off-site transportation, of ore, and disposal of tailing. The types and magnitude of impacts may vary with the

[4]Maest, A.S., Kuipers, J.R., Travers, C.L., and Atkins, D.A., 2005. *Predicting Water Quality at Hardrock Mines: Methods and models, uncertainties, and state-of-the-art.* 2005. Prepared for Earthworks. 77pp. Available online at: http://www mine-aid.org/predictions/

project life cycle (construction, operation, temporary shutdown, closure, and post closure).

Wetlands

The NEPA analysis should include a map of surface water, including wetlands, in the project area. The analysis should discuss how many lineal feet of streams, acres of wetlands and what type of wetlands would be impacted by the mine expansion. There should be a discussion of how Clean Water Act (CWA) Section 404(b)(1) Guidelines requirements for wetlands would be met if there are activities that could have direct impact to streams and wetlands, potential impacts to adjacent wetlands or indirect impacts to wetlands such as hydrologic changes due to increases in impervious surface will be evaluated. As preparation of this EIS will also serve to satisfy NEPA requirements of the Clean Water Act Section 404 permit issued by the Army Corps of Engineers, the document should clearly justify the least environmentally damaging practicable alternative.

Water Management and Treatment

The NEPA analysis should explain the current and proposed operations plans for water management and treatment. The EIS should evaluate and disclose the adequacy, reliability, and operational uncertainty associated with proposed water management techniques over the range of operating and climatic conditions. The analysis should characterize chemical compositions and quantities of process waters, mine drainage, storm water, and treated and untreated effluents. This information should be supported by the results of treatability testing. Assumptions used in the analysis should be reasonably conservative.

Marine Environment

The EIS should discuss connected actions associated with the mine that may have potential impacts on the marine environment (e.g., proximity of facilities to Hawk Inlet). The EIS should discuss past and current monitoring of the marine habitat and water quality. This includes discussing any past or potential impacts to the "Habitat Areas of Particular Concern" as defined in the 2003 final EIS (e.g., kelp beds) and essential fish habitat.

Air Quality

The EIS should include baseline air quality data prior to mine operations as well as data from existing monitoring reports. The EIS should identify any anticipated issues based on past practices and what mitigation would be used. The EIS should also disclose current operation plans used to minimize/restrict air emissions and fugitive dust and how they may be revised for the expansion.

It is reasonable to expect that construction of the mine and ongoing mine operations will result in greenhouse gas (GHG) emissions. These emissions should be disclosed in the EIS (metric tons CO_2 equivalents/yr). We recommend implementing measures to reduce GHG emissions and offer the following for consideration as components of a construction air pollutant emissions control plan.

- Evaluate the use of available alternative engines and diesel fuels:
    - Diesel engines that meet the proposed EPA 2007 regulation of 0.01 g/bhp-hr (grams per brake horsepower hour)
    - Diesel engines outfitted with catalyzed diesel particulate filters and fueled with low sulfur (less than 15 ppm sulfur) fuel
    - Fueling on-site equipment, e.g., mining equipment, with lower sulfur highway diesel instead of off-road diesel fuel
- Install control equipment on diesel construction equipment (particulate filters/traps (DPTs), oxidizing soot filter, oxidation catalysts, and other appropriate control devices to the greatest extent that is technically feasible.) Different control devices may be used simultaneously.
- See www.epa.gov/otaq/retrofit/index.htm for verification of technology retrofit emissions reductions related to any project mitigation measures.
- Establish idling limit (e.g., 5-10 minutes per hour).
- Prohibit any tampering with engines and require continuing adherence to manufacturers' recommendations.

Transportation of Hazardous Materials and Concentrates

A recurring problem at mine sites is related to transportation incidents involving hazardous materials. The NEPA analysis should characterize risks related to transportation incidents, and describe mitigation, response planning, and monitoring programs to mitigate for expected problems.

Roads

Road construction and reconstruction are of key concern to EPA because roads can be a large contributor of sediment to streams and interrupt the subsurface flow of water, particularly where roads cut into steep slopes. In addition, roads and their use contribute to habitat fragmentation, wildlife disturbance, the introduction or exacerbation of noxious weeds, and increased fire danger from recreational activities. The EIS should describe in detail the location of existing roads and proposed construction of roads and how stormwater would be managed to reduce impacts to surface water.

Monument Value and Inventoried Roadless Area (IRA)

The EIS should discuss the setting of the Admiralty Island National Monument and how activities proposed do not affect this designation outside the mine boundary. The EIS should also disclose any reasonable foreseeable activities that would encroach on the intrinsic and ecological values of the monument.

The EIS should disclose the IRAs surrounding the project and how IRAs will be maintained. We strongly recommend maintaining these areas and discussing the Forest Plan standards and guidelines as it relates to this portion of the Tongass and this project.

Fish and Wildlife

We recommend that the NEPA analysis clearly discuss and list in a table format any ESA listed species that occur in the project area. This section should be linked to habitat discussion and should include a discussion of what activities are being proposed to avoid impacting listed and sensitive species. We also recommend that the EIS include the biological evaluation and any terms and conditions recommended by NOAA and USFWS.

Monitoring

The NEPA analysis should describe project monitoring in some detail. We recommend as a general rule that the level of effort afforded monitoring be commensurate with the complexity of the project and the risk to and sensitivity of the affected environment if a project is permitted and/or approved. As a first step, we recommend that the NEPA analysis clearly define the goals and objectives of monitoring, and present an overall monitoring strategy for the project. Second, the NEPA analysis should provide enough detail on the monitoring program for reviewers to evaluate whether the goals and objectives of monitoring will be achieved. This can generally be satisfied by providing summary information on monitoring (including a list of measurement parameters, methods, locations and frequency), data analysis, and reporting. In addition, we recommend that alternatives include clear requirements for regular analysis and reporting of data to oversight agencies, and include a requirement that the operator submit a full sampling and quality assurance plan for agency approval. The NEPA analysis should discuss who will conduct monitoring, the frequency and how monitoring will direct management decisions.

Adaptive Management Planning

The NEPA analysis should describe the strategy for responding to unforeseen circumstances at the site. Adaptive management and contingency planning are particularly important projects that carry a high level of uncertainty in predictions of environmental consequences. The strategy should include "trigger levels" (e.g., exceedance of ecological benchmarks) or observations (e.g., statistically significant trends in indicators, permit violations, water balance problems, changes in discharge or chemistry of springs/seeps) that would set in motion a follow-up action. This strategy or plan should be described so that reviewers may comment on its adequacy. This type of plan when coupled with the monitoring program is necessary to mitigate for uncertainties and risks associated with predictions of environmental outcomes, and will provide an early warning system of unexpected outcomes. Such plans are necessary to ensure that post-mining land use objectives can be achieved and sustained in the future.

Cumulative Impacts

A cumulative effects analysis should be done for potential impacts to natural resources due to potential foreseeable actions (e.g. expansion of mine on private land or other ground disturbing action that could natural resources) regardless of what agency (Federal or non-Federal) undertakes the action (40 CFR § 1508.7). We recommend that projects covered by the proposed action utilize the best available science through

effective watershed hierarchy and a watershed approach when identifying, quantifying and mitigating cumulative impacts. EPA has issued guidance on how we are to provide comments on the assessment of cumulative impacts[5]. The guidance is a good tool to assess the adequacy of the cumulative impacts assessment in five key areas. EPA tries to assess whether the cumulative affects analysis:

1. Identifies resources if any, that are being cumulatively impacted;
2. Determines the appropriate geographic (within natural ecological boundaries) area and the time period over which the effects have occurred and will occur;
3. Looks at all past, present, and reasonably foreseeable future actions that have affected, are affecting, or would affect resources of concern;
4. Describes a benchmark or baseline;
5. Includes scientifically defensible threshold levels.

We recommend that Forest Service review the guidance and include requirements in the NEPA analysis to assure these areas are addressed in the cumulative effects analysis for proposed projects.

Climate Change

The EIS should describe the current conditions related to climate and future predictions of climate shifts in the Northwest. Potential effects of climate change may include changes in hydrology, sea level, weather patterns, precipitation rates, and chemical reaction rates. CO_2 concentrations also lead to preferential fertilization and growth of specific plant species. The cumulative effects analysis should include a discussion on potential changes in precipitation, stream flow, changes in vegetation and wildfire frequency. A key component of site restoration involves success of revegetation to reduce erosion and impacts to the surrounding environment. We recommend that adaptive management be built in to post closure monitoring and management so that measures can be taken in response to potential changes in site conditions that results in mass wasting and affects to COPC source control measures.

Consultation with Native American Tribes

The NEPA analysis should not only discuss the historical structures that exist in the project area but also cultural resources and impacts to Native Americans. The NEPA analysis development should be conducted in consultation with all affected tribal governments, consistent with Executive Order (EO) 13175 (*Consultation and Coordination with Indian Tribal Governments)*. EO 13175 states that the U.S. government will continue to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, trust resources, and Indian tribal treaty and other rights. Documentation of these consultations should be included in the document prepared under this action. Consistent with the July 28, 1999 memorandum from the Council on Environmental Quality (CEQ) to Heads of Federal Agencies, we strongly urge the Services to consider inviting affected Tribal governments to participate in the NEPA analysis development process as cooperating agencies. This

[5] *Consideration of Cumulative Impacts in EPA Review of NEPA Documents,* http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf .

would provide for the establishment of a mechanism for addressing intergovernmental issues throughout the planning process. The NEPA analysis should identify Tribal concerns and issues and discuss how these will be mitigated.